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REPORT

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very high pressure
inorganic compounds
hydrocarbons

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This volume consists of 2 parts. Section A2 lists shock wave data for inorganic compounds. Binary and more complex compounds (including minerals) are listed. Section B lists shock wave data for hydrocarbons. Among hydrocarbons listed are anthracene, benzene, hexane, paraffin, polyethylene and polystyrene.

UCRL-50108 Vol. 2 Rev. 1

COMPENDIUM OF SHOCK WAVE DATA

SECTIONS A2-B

M. van Thiel

June 1977

LAWRENCE LIVERMORE LABORATORY
University of California Livermore, California 94550

UCRL-50108 Vol. 2 Rev. 1

COMPENDIUM OF SHOCK WAVE DATA

Section A2 - Inorganic Compounds
Section B - Hydrocarbons

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MS. date: June 1977

Notice

The completeness of this compilation depends upon its users. To assure its continued usefulness, users are urged to send any missing or new shock wave data and corrections to the Editor, M. van Thiel, Lawrence Livermore Laboratory, P.O. Box 808, Livermore, California, U.S.A., 94550.

New and revised pages will be distributed as necessary.

UCRL-51098 VOL 2 REV 1 COMPENDIUM OF SHOCKWAVE
DATA SECTIONS A2-B M. VAN THIEL JUN 77
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	1	2	3	4	5	6	7	8	9	10	11	12	13	14
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LAWRENCE LIVERMORE LABORATORY

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COMPEND' ˀCK WAVE DATA

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SECTION A2

INORGANIC COMPOUNDS

2-1---0
WATER SUMMARY

H2-O

T = 20 DEG. C   CO = 1.483 KM/SEC
VO = 1.0018 CC/G

THE TABLE LISTS HUGONIOT POINTS CALCULATED FROM THE FITS GIVEN BELOW.
UNITS ARE: G/CC, KM/SEC, KBARS AND KBAR.CC/G FOR THE ENERGY DIFFERENCE.

TABLE

FIT	RHOO	US	UP	P	V/VO	E-EO
1	0.9982	3.318	.9	29.8	0.729	4.05
-	-	4.106	1.4	57.4	0.659	9.80
-	-	4.897	1.9	92.9	0.612	18.0
-	-	5.687	2.4	136.	0.578	28.8
2	-	6.591	3.0	197	0.545	45.0
-	-	7.751	4.0	309	0.484	80.
-	-	8.911	5.0	445	0.439	125.
-	-	11.231	7.0	785	0.377	245.
-	-	13.551	9.0	1217	0.336	405.

US = 1.893 + 1.581*UP, SIG.US = 0.03 KM/SEC   FIT 1
FOR UP BETWEEN 0.9 AND 2.4 KM/SEC
US = 3.111 + 1.160*UP, SIG.US = 0.16 KM/SEC   FIT 2
FOR UP BETWEEN 3.3 AND 8.7 KM/SEC.

COMMENTS:

1) SOURCE: COMPILER
DATA OF 2-1---1 AND 3 WERE USED FOR THIS SUMMARY.
2) THE TWO-STRAIGHT-LINE CHARACTER OF THE US UP DATA MAY BE ASSOCIATED WITH A PHASE TRANSFORMATION:
L. V. AL'TSHULER, A. A. BAKANOVA AND R. F. TRUNIN
DOKLADY AKAD. NAUK SSSR.   VOL. 121, P. 67, (1958) RUSS.
SOVIET PHYS. DOKLADY   VOL. 3,   P. 761, (1958) ENGL.
3) DATA OF 2-1---4 AGREE WITH THIS FIT BUT ARE LESS PRECISE.
4) CO IS HIGHLY TEMPERATURE DEPENDENT: CO(10 DEG. C.) = 1.448 KM/SEC
CO(30 DEG. C.) = 1.509 KM/SEC
L. BERGMANN, DER ULTRASCHALL (S. HIRZEL VERLAG, STUTTGART 1954)
6TH ED. P. 410

2-1---0
WATER SUMMARY

H2-0

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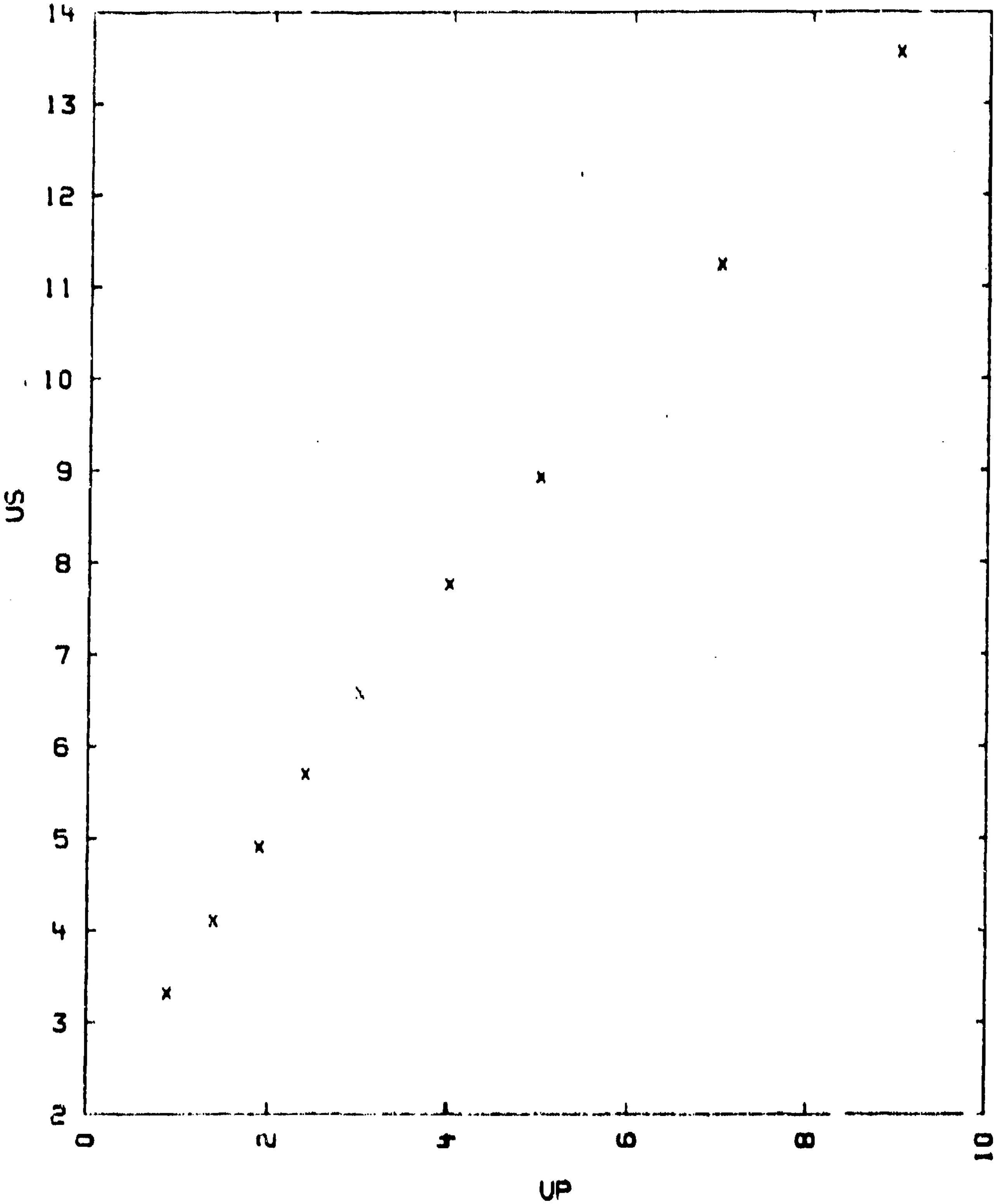
CO(30 DEG. C.) = 1.509 KM/SEC
L. BERGMANN, DER ULTRASCHALL (S. HIRZEL VERLAG, STUTTGART 1954) 6TH ED. P. 410.

TABLE I

WATER SUMMARY
2-1---0



2-1---1
WATER (HYDROGEN OXIDE)

H2-O GREATER THAN 99.9 PER CENT

V0 = 1.002 CC/G   C0 = 1.5 KM/SEC

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN MM/MICRO-SEC, AND PRESSURE IN KILOBARS.

TABLE

RHO0	US	UP	P	V/V0
1.00	7.06	3.32	235	.530
	7.05	3.39	240	.491
	6.89	3.44	240	.498
	8.26	4.53	378	.447
	12.85	8.09	1040	.370
	12.69	8.43	1070	.336
	13.09	8.71	1140	.335

US = 3.09 + 1.164UP - .1138(UP - 3.76) MM/MICROSEC   FOR UP LESS THAN 3.76

US = 3.09 + 1.164UP MM/MICROSEC   FOR UP GREATER THAN 3.76

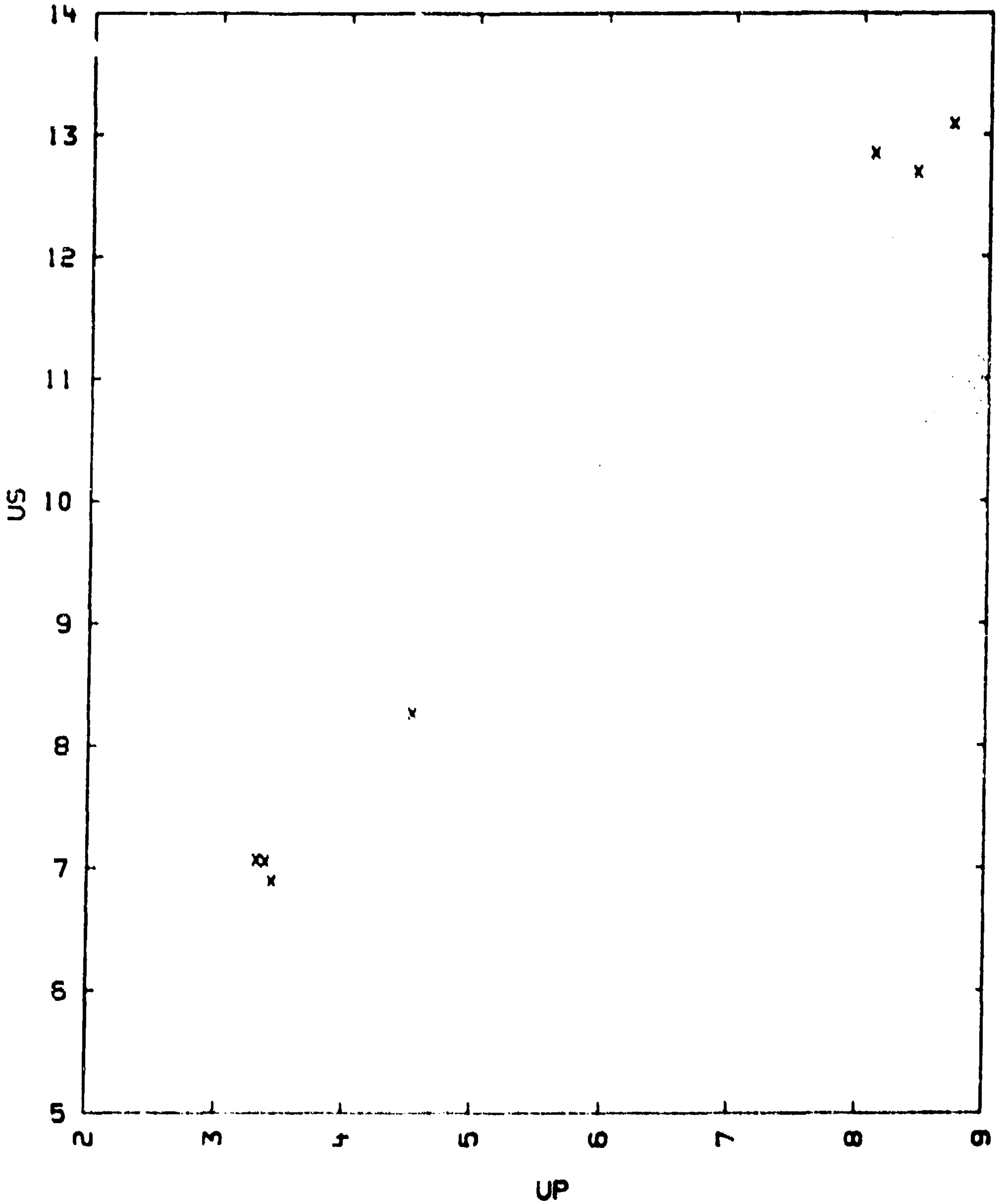
COMMENTS:

1) SOURCE: SKIDMORE, I.C. AND MORRIS, E.
THERMODYNAMICS OF NUCLEAR MATERIALS, P. 173 FF. (1962)
INTERN. AT. ENERGY AGENCY, VIENNA
ATOMIC WEAPONS RESEARCH ESTABLISHMENT, ALDERMASTON, ENGLAND
2) EXPERIMENTAL TECHNIQUE A
DATA REDUCTION TECHNIQUE B
THE SHOCK WAS PRODUCED BY AN EXPLOSIVELY ACCELERATED EN3 STEEL PLATE. THE SHOCK WAS TRANSMITTED THROUGH A STEEL PLATE INTO THE SAMPLE.
3) THE VELOCITY OF THE FLYING PLATE AND THE SHOCK AND SURFACE VELOCITY OF THE TARGET PLATE WERE MEASURED AS WELL AS THE SAMPLE SURFACE AND SHOCK VELOCITIES.
4) DATA SCATTER WAS ABOUT 0.03 MICROSEC.
5) CORRECTIONS WERE MADE FOR FLYING PLATE CURVATURE OF UP TO 1 MICROSEC.
6) THE HIGHER PRESSURES WERE OBTAINED BY A SPHERICALLY CONVERGING SYSTEM.
7) ALL PELLETS WERE SURROUNDED BY LEAD TO REDUCE LATERAL RAREFACTION.

TABLE I

WATER (HYDROGEN OXIDE)

2-1---1



2-1---2
WATER (HYDROGEN OXIDE)

H2-O

VOI = 1.00 CC/G

THE TABLE BELOW GIVES THE VELOCITY OF RELAXATION WAVE, C, AT THE GIVEN PRESSURE. THE HUGONIOT STATE THE RELAXATION WAVE TRAVELS THROUGH IS GIVEN BY US, U, P AND V/VO. VELOCITIES ARE GIVEN IN KM/SEC., PRESSURE IN KILOBARS AND DENSITY IN G/CC.

TABLE

SOUND VELOCITY
PERPENDICULAR TO SHOCK DIRECTION

RHOO	US	UP	P	V/VO	C
1.00	4.42	1.52	67.2	0.656	5.60

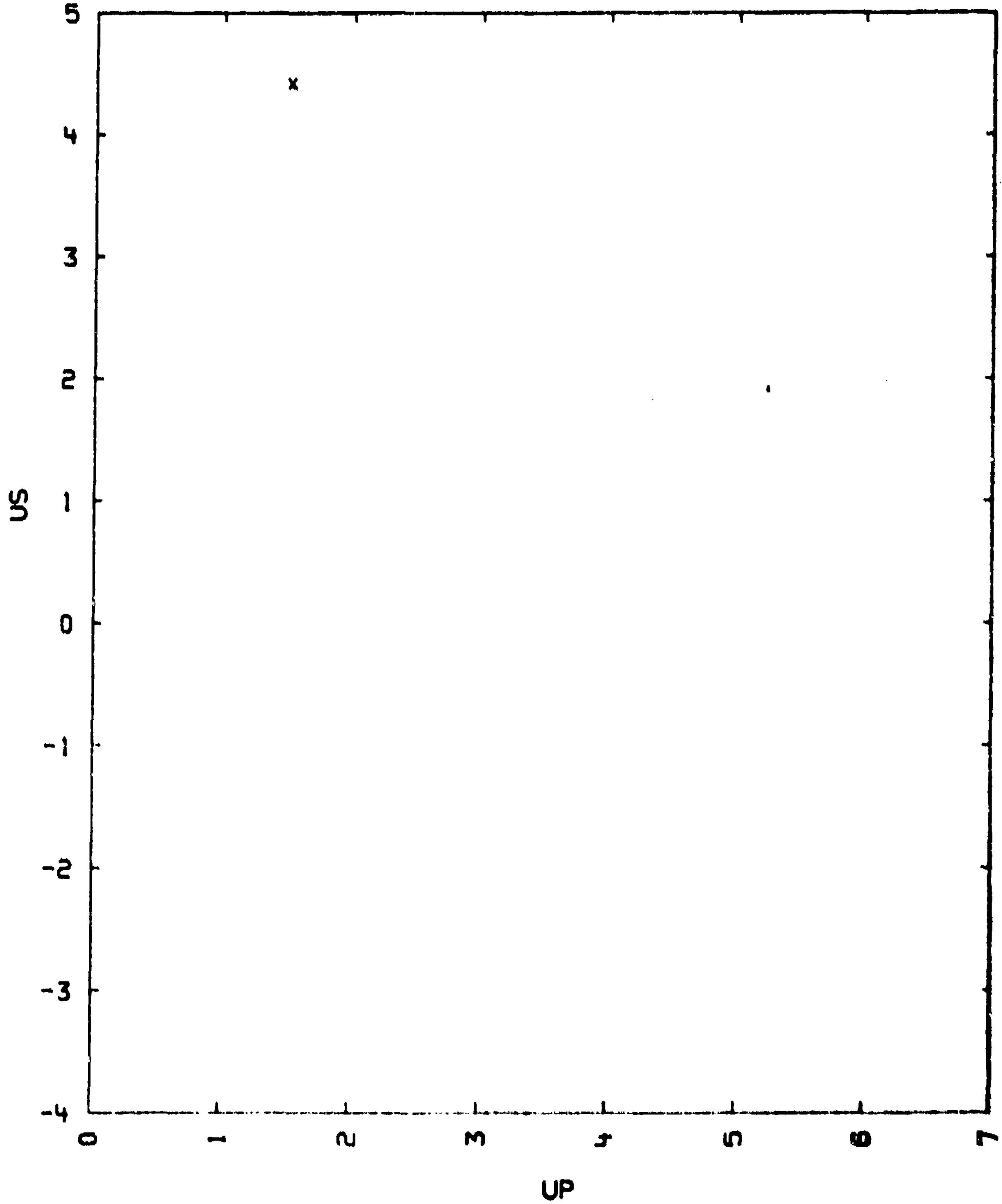
US =

COMMENTS:

1) SOURCE: AL'TSHULER, L. V., KORMER, S. B., BRAZHNIK, M. I., VLADIMIROV, L. A. AND FUNTIKOV, A. I.
SOVIET PHYS.-JETP, VOL. 11, P. 766 (1960)
2) EXPERIMENTAL TECHNIQUE B
3) THE SOUND VELOCITIES WERE DETERMINED FROM THE CONTOUR OF THE FREE SURFACE AFTER IT HAD MOVED SOME DISTANCE.
4) THE MEASURED SOUND VELOCITY IS SLIGHTLY SMALLER THAN THE VELOCITY (DP/DRHO)**1/2 = 5.85 KM/SEC., WHERE THE DERIVATIVE IS TAKEN ALONG THE HUGONIOT.
5) VOI WAS OBTAINED FROM THE HANDBOOK OF CHEMISTRY AND PHYSICS (THE CHEMICAL RUBBER PUBLISHING CO., CLEVELAND, OHIO, 1962-1963) 44TH ED.

TABLE I

WATER (HYDROGEN OXIDE)
2-1---2



2-1---3
WATER (HYDROGEN OXIDE)

H2-O

TO = 20 DEG. CENTIGARDE
VO = 1.0018 CC/G   CO = 1.4829 KM/SEC.

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN KM/SEC., PRESSURE IN KILOBARS AND DENSITY IN G/CC.

TABLE

RHOO	US	UP	P	V/VO
0.9982	3.354	0.952	31.8	0.716
-	4.093	1.392	56.8	0.660
-	4.126	1.411	58.2	0.658
-	4.536	1.655	74.9	0.635
-	4.813	1.829	87.8	0.620
-	4.777	1.806	86.1	0.622
-	4.757	1.798	85.4	0.622
-	5.626	2.385	133.9	0.576
-	5.604	2.370	132.5	0.577
-	5.601	2.335	130.5	0.583
-	8.07	4.13	333.0	0.488
-	8.07	4.24	342.0	0.475
-	8.45	4.60	386.0	0.456
-	8.49	4.72	400.0	0.444
-	8.59	4.72	405.0	0.450
-	8.74	4.81	419.0	0.450

US = 1.57 + 1.946*UP - 0.097*UP**2 KM/SEC, SIG US = 0.05 KM/SEC
BUT LINEAR FIT IS ADEQUATE FOR UP BELOW 4. KM/SEC :
US = 1.89 + 1.58*UP KM/SEC, SIG.US = 0.03 KM/SEC.

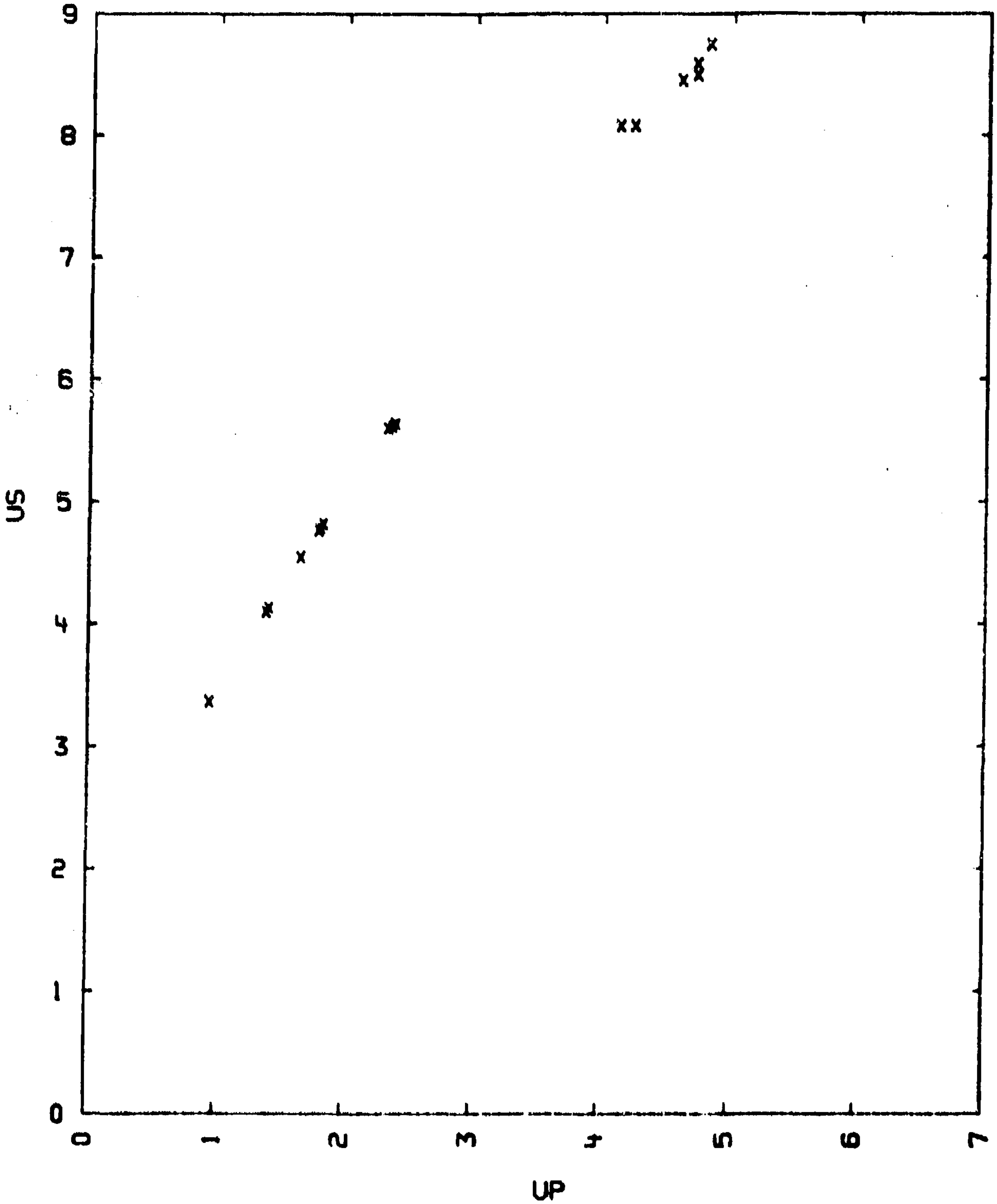
COMMENTS:

1) SOURCE: WALSH J. M. AND RICE M. H.
JOURNAL OF CHEMICAL PHYSICS, VOL. 26, P. 815(1957)
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION TECHNIQUE B
STANDARD MATERIAL 24ST ALUMINUM
3) THE TOTAL SCATTER IN US IS TYPICALLY 3 TO 4 PERCENT, AND THE AVERAGE VALUE OF US HAS A PROBABLE ERROR OF ABOUT 0.5 PERCENT. THE UNCERTAINTY IN UP IS COMPARABLE TO THIS AVERAGE VALUE.
4) CO WAS OBTAINED FROM THE AMERICAN INSTITUTE OF PHYSICS HANDBOOK, (MCGRAW-HILL BOOK CO., N. Y. 1963) 2ND ED.

TABLE I

WATER (HYDROGEN OXIDE)

2-1---3



2-1---4
WATER

H2O

V0 = 1.00

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN KM/SEC., PRESSURE IN KILOBARS AND DENSITY IN G/CC.

TABLE

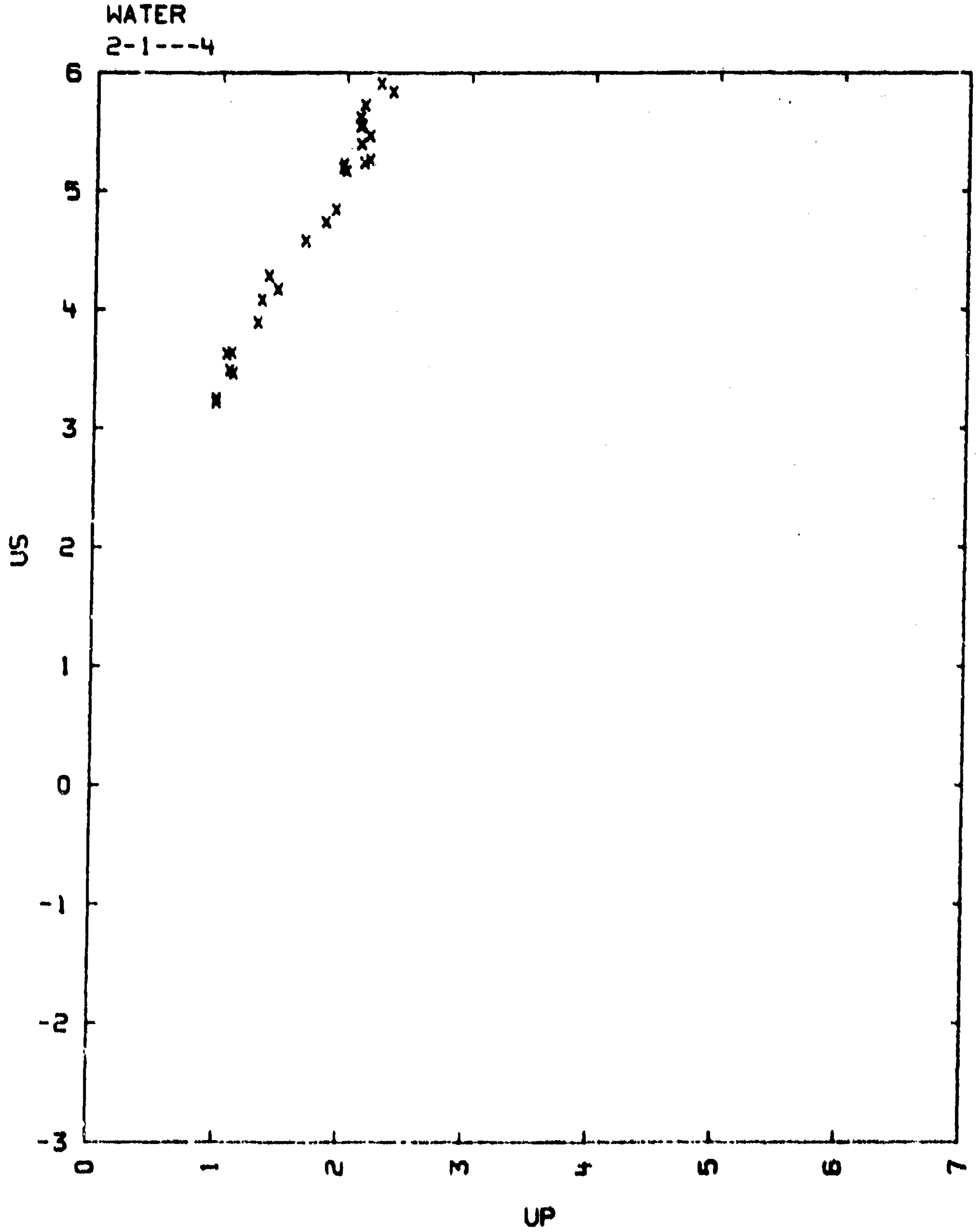
SAMPLE					STANDARD	
RHO0	US	UP	P	V/V0	UFS (ALUMINUM)	UFS (PLEXIGLASS)
1.00	5.835	2 385	138	0.595		4,740
-	5.900	2.270	134	0.615		4.590
-	5.725	2.140	122.5	0.626		4.310
-	5.625	2.115	119	0.624		4.230
-	5.555	2.125	118	0.617		4.220
-	5.545	2.110	117	0.619		4.190
-	5.460	2.180	119	0.601	2.890	
-	5.395	2.120	114.5	0.607	2.785	
-	5.260	2.165	115	0.585	2.860	
-	5.235	2.140	112	0.591	2.775	
-	5.160	2.005	103.5	0.611	2.630	
-	5.225	1.980	103.5	0.621	2.625	
-	5.185	1.975	102.5	0.619	2.640	
-	4.830	1.915	92.5	0.604	2.460	
-	4.730	1.840	87	0.611	2.360	
-	4.570	1.675	76.5	0.633	2.145	
-	4.165	1.465	61	0.648	1.840	
-	4.280	1.390	59.5	0.675	1.770	
-	4.075	1.340	54.5	0.671	1.695	
-	3.885	1.300	50.5	0.665	1.615	
-	3.635	1.100	40	0.697	1.375	
-	3.465	1.110	38.5	0.680	1.360	
-	3.625	1.060	38.5	0.708	1.300	
-	3.480	1.080	37.5	0.690	1.325	
-	3.240	0.970	31.5	0.697	1.170	
-	3.205	0.970	31	0.697	1.145	

US = 1.51 + 1.85 UP KM/SEC. SIG.US = 0.15 KM/SEC.

COMMENTS:

1) SOURCE: BERGER J. AND FAUQUIGNON C.
PRIVATE COMMUNICATION (1964), B.P. NO. 7, SEVRAN, FRANCE
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION TECHNIQUE B
STANDARD MATERIALS PLEXIGLASS AND ALUMINUM AU4G ALLOY

TABLE 1



2-1---5
WATER

H2-O

TO= 20 DEG C.
VOI=1.0037 CC/G

THE TABLE LISTS T IN DEG.C., RHOO IN G/CC. VELOCITIES IN KM/SEC AND P IN KBARS. RI IS REFRACTIVE INDEX. AL IS 2024 ALUMINUM

TABLE

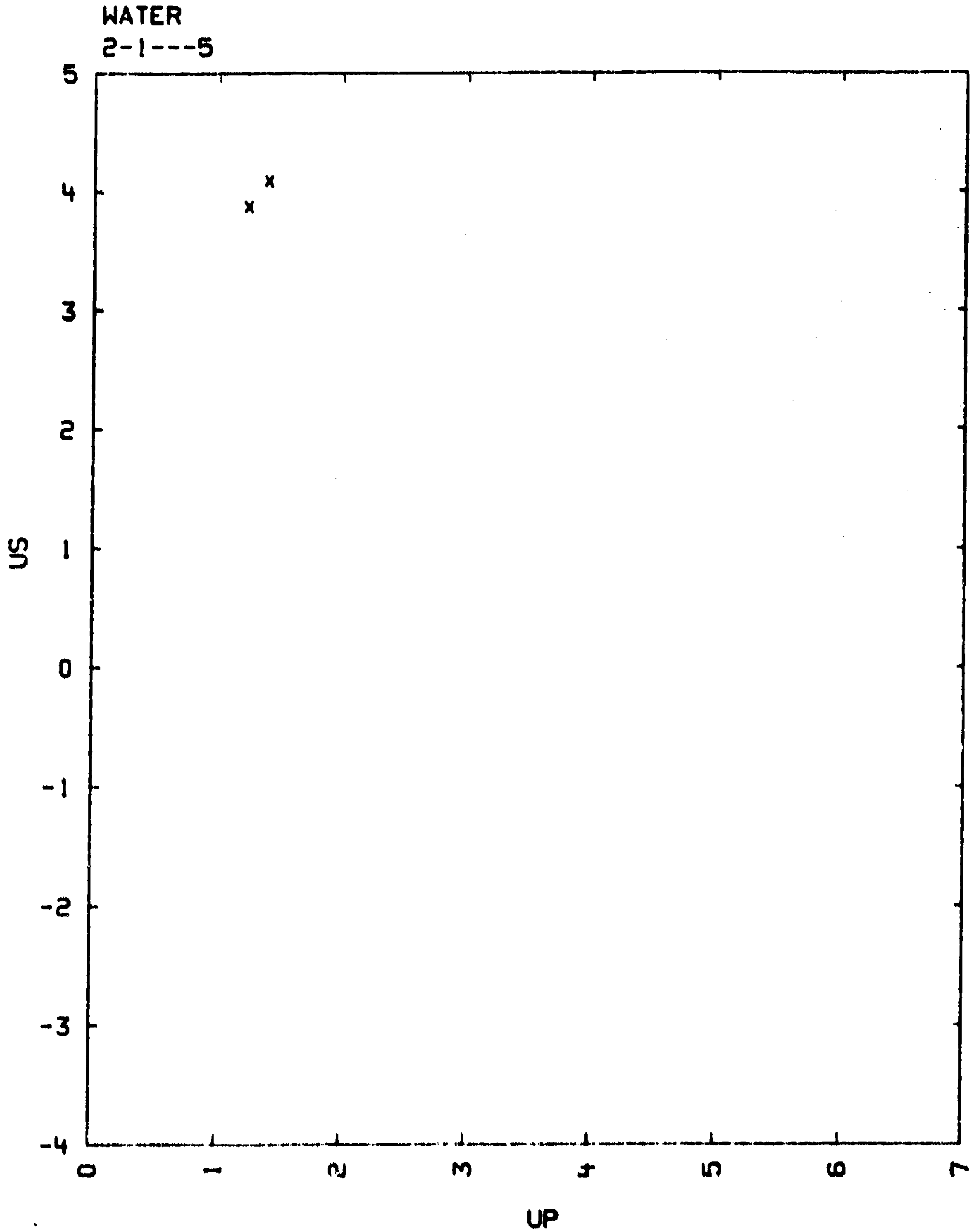
- - - - - - - - - -	SAMPLE	- - - - -	- - - - -				STANDARD	
TO	RHOO	US	UP	P	V/VO	RI	UFS	MAT
20.	0.9983	3.87	1.245	48.0	0.6783	1.474	1.55	AL
20.	0.9983	4.09	1.40	57.0	0.6577	1.482	1.78	AL
20.	0.9982			0.	1.00	1.333		

US =

COMMENTS:

1) SOURCE: AHRENS T.J. AND RUDERMAN M.H.
J. APPL. PHYS., V.37 P 4758 (1966)
2) EXPERIMENTAL TECHNIQUE: D AND CI
DATA REDUCTION METHOD : B
3) VOI AN RHOO FROM THE AMERICAN INST. OF PHYS. HANDBOOK, D.E. GRAY EDITOR (MCGRAW HILL BOOK CO. 1972) 3RD ED.
4) UNCERTAINTY: DEL US=1-1.5 PERCENT
DEL UP=2.5 - MAXIMUM
DEL RI=1.3 -

TABLE I



10-9---1
CHLORINE TRIFLUORIDE

CL-F3

T0 = 0.0 +OR-0.7 DEG. C.
V0 = 0.5305 +OR-B CC/G

C0 = 0.904 KM/SEC.

THE TABLE LISTS DENSITY IN G/CC., VELOCITIES IN KM/SEC. AND PRESSURE IN KBAR.

TABLE

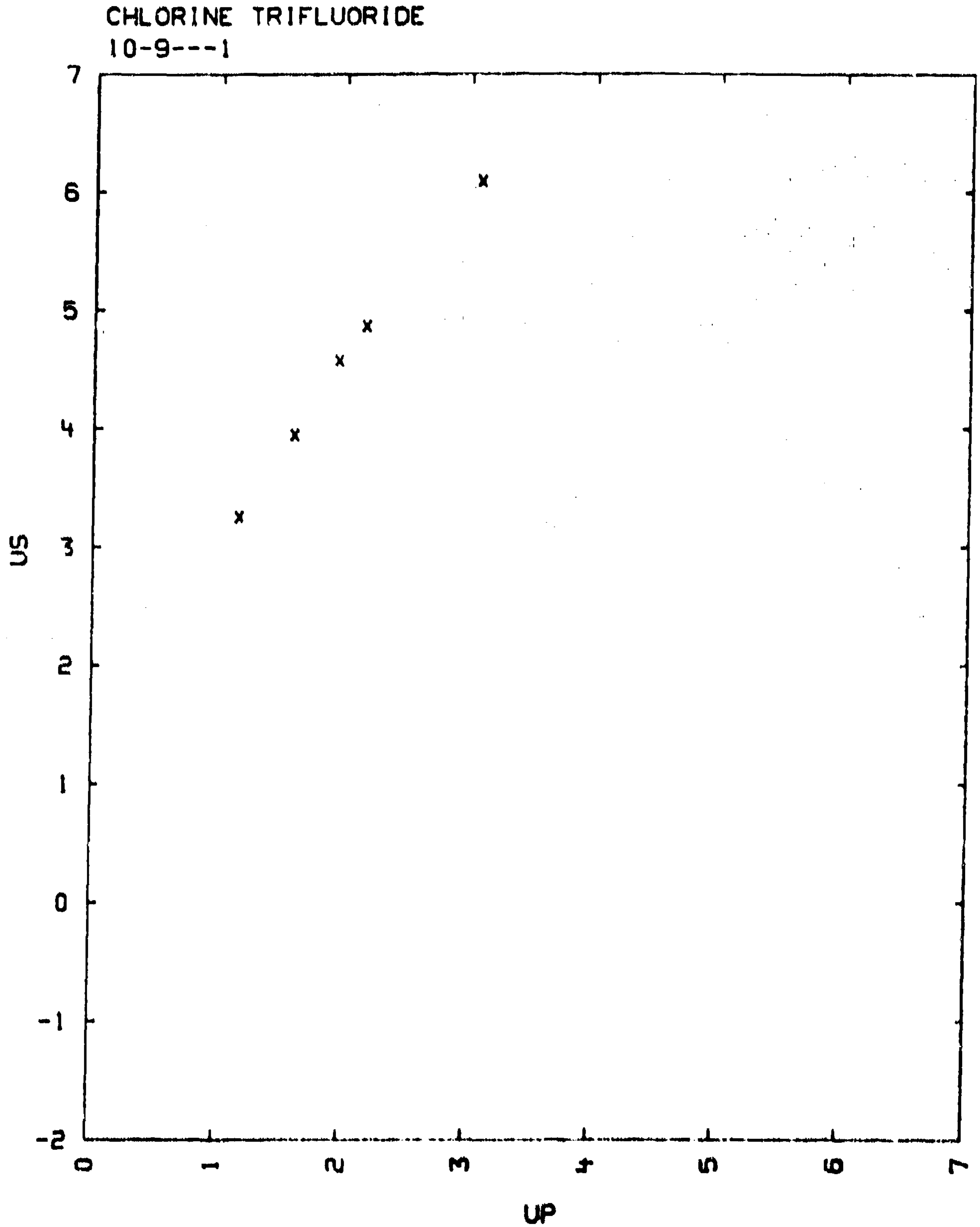
- - - - - - SAMPLE	- - - - - -				- STANDARD -	
RHO0	US	UP	P	V/V0	UP(ST)	P(ST)
1.885	3.24	1.17	72.	0.64	0.80	144.
-	3.94	1.61	120.	0.592	1.14	220.
-	4.56	1.96	168.	0.57	1.43	291.
-	4.86	2.17	199.	0.554	1.61	336.
-	6.09	3.09	353.	0.49	2.37	565.

US = 1.318 + 1.64*UP FOR UP LESS THAN 2.17 KM/SEC.
US = 2.147 + 1.26*UP FOR UP GREATER THAN 2.17 KM/SEC., OR
US = 0.947 + 2.12*UP**2. KM/SEC OVER THE TOTAL RANGE
SIG.US =0.034 KM/SEC.

COMMENTS:

1) SOURCE: JEFFRIES, R. A. AND WACKERLE J.
LOS ALAMOS REPORT: LA-3453 (1966)
LOS ALAMOS SCIENTIFIC LAB., BOX 1663, LOS ALAMOS, N. M. 87544
2) EXPERIMENTAL TECHNIQUE: B
DATA REDUCTION TECHNIQUE: B (STANDARD MATERIAL: 2024 AL. ALLOY)
3) ERROR ESTIMATES FOR US ARE: .02 .01 .02 .01 .10 KM/SEC.
ERROR ESTIMATES FOR UP ARE: .02 .01 .02 .01 .10 KM/SEC.
IN THE ORDER OF THE TABLE LISTING.
4) MEASUREMENTS OF C0 AS A FUNCTION OF TEMPERATURE (T) YIELDED:
C0 = 0.904(1.0 - 0.0038*T + 0.00000*T**2.) KM/SEC., BETWEEN T = -60 AND +20 DEG. C.

TABLE I



18-14-2-1---1
AMMONIUM SULFATE

(N-H4)2-S-O4 = N2-S-H8-O4
SPECIFIC SURFACE AREA IN (CM**2)/G.: 540 AND 1900(FOR THE LAST FIVE ENTRIES IN TABLE III).

V0 = 0.568-0.769 CC/G.
V0I = 0.5853 CC/G.

THE TABLES BELOW GIVE DENSITY IN G/CC, VELOCITIES IN KM/SEC AND PRESSURE IN KBARS. P(ST) IS THE PRESSURE IN THE STANDARD.

TABLE I

------- SAMPLE					----------	STANDARD
RHO0	US	UP	UFS	P	V/V0	P(ST)
1.73	3.92	0.20	0.45	14.	0.949	10.
-	4.50	0.55	1.21	43.	0.878	31.
-	4.80	0.93	1.69	77.	0.806	59.
-	5.81	1.46	3.0	147.	0.749	111.
-	6.16	1.87		200	0.696	161.

US = 3.71 + 1.34 UP KM/SEC.
SIGMA US = 0.13 KM/SEC

TABLE II

------- SAMPLE					----------	STANDARD
RHO0	US	UP	UFS	P	V/V0	P(ST)
1.6	2.43	0.28	0.44	11.	0.887	10.
-	3.24	0.61	1.13	32.	0.814	28.
-	3.53	0.68	1.21	38.	0.808	30.
-	3.93	1.02	2.84	64.	0.742	57
-	4.20	0.99	1.87	66.	0.764	57.
-	4.34	1.13	2.57	78.	0.746	63.
-	5.18	1.57	3.65	130.	0.697	112.
-	5.78	1.83	4.88	170.	0.683	138.

US = 2.29 + 1.91*UP - 0.107/UP KM/SEC.
SIG.US = 0.12 KM/SEC.

TABLE III

------- SAMPLE ---------- STANDARD

RHOO	US	UP	UFS	P	V/VO	P(ST)
1.3	5.26	2.31	5.80	158.	0.561	162.
-	4.74	1.79		110.	0.622	114.
-	3.51	1.21	2.98	55.	0.655	60.
-	2.65	0.81	1.83	28.	0.694	32.
-	1.57	0.36	0.56	7.	0.771	10.
-	5.50	2.50		178.	0.545	185.
-	5.35	2.29		159.	0.572	164.
-	4.84	1.83		115.	0.622	116.
-	4.04	1.80		113.	0.628	114.
-	4.40	1.78		102.	0.595	108.
-	3.56	1.15		53.	0.677	55.
-	2.76	0.78	0.84	28.	0.717	31.
-	5.40	2.26	5.6	158.	0.581	162
-	4.54	1.77	4.2	104.	0.610	109.
-	3.38	1.12		49.	0.669	54.
-	2.67	0.96		33.	0.640	40.
-	1.78	0.41		9.	0.770	13.

US = 0.55 + 2.94*UP - 0.37*UP**2. KM/SEC.
SIG.US = 0.15 KM/SEC.

COMMENTS:

1) SOURCE: JOHNSON J. O. AND WACKERLE J.
HIGH DYNAMIC PRESSURE SYMPOSIUM, I.U.T.A.M., SEPT. 11-15 1967
PARIS, FRANCE.
2) EXPERIMENTAL TECHNIQUE D.
DATA REDUCTION TECHNIQUE: B, STANDARD MATERIAL - LUCITE, WITH
US = 2.75 + 1.49*UP AND UP = 0.5*UFS
3) THE SAMPLES WERE ANALYTICAL REAGENT GRADE AMMONIUM SULFATE WHICH
WAS PRESSED INTO 2.54 CM DIAMETER BY 0.203 CM THICK WAFERS.
4) VOI WAS CALCULATED USING THE LATTICE CONSTANTS A = 7.782,
B. = 5.993, AND C. = 10.636 ANGSTOMS FOR A ORTHORHOMBIC CELL.
WYCKOFF, CRYSTAL STRUCTURES VOL. 3 (JOHN WILEY AND SONS, NEW YORK,
1963) 2ND. ED.
5) ESTIMATED PERCENT UNCERTAINTIES ARE 3.5 IN P(ST), 2.6 IN UP, 2. IN US
2.3 IN P AND 3. IN V/VO

TABLE I

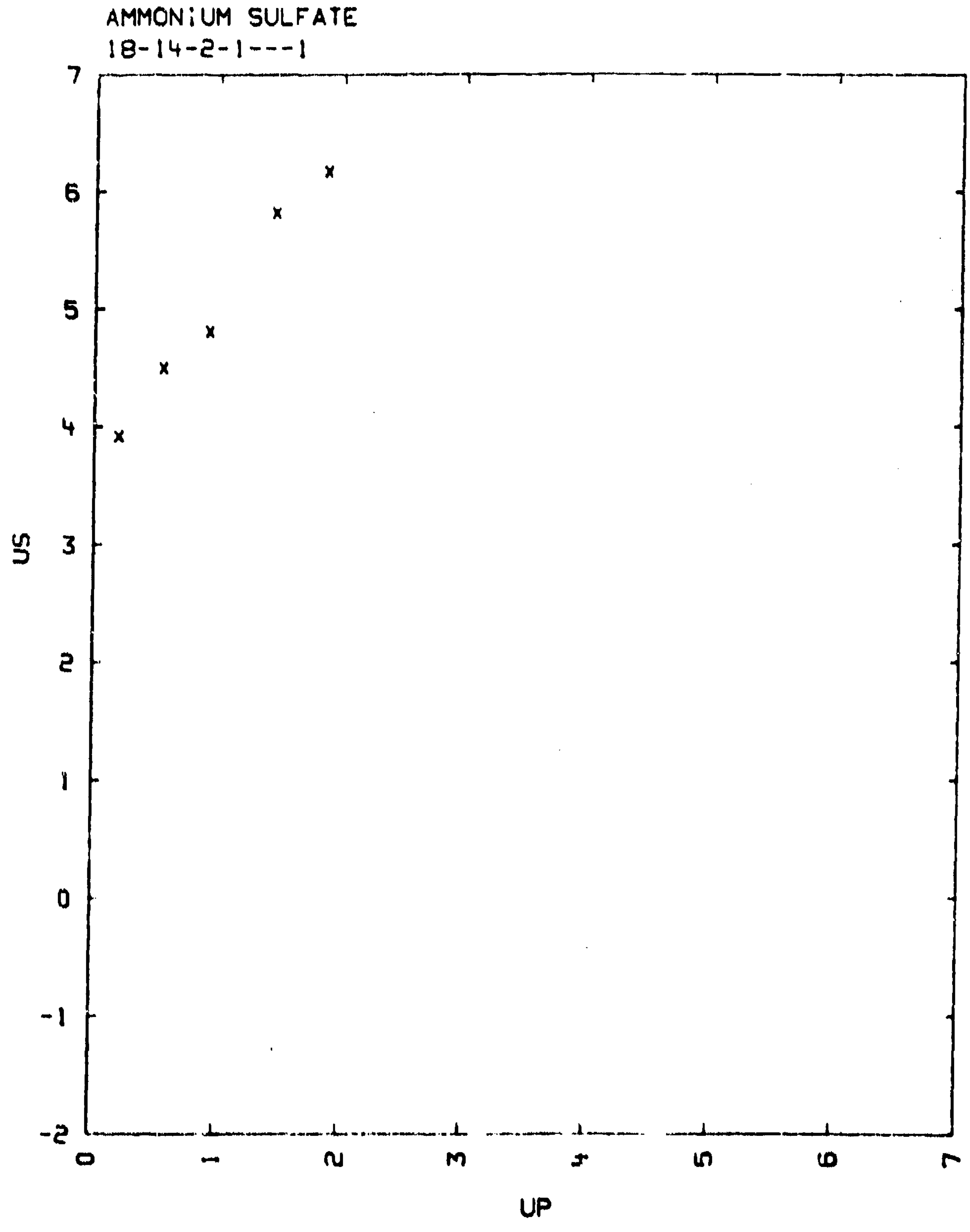


TABLE II

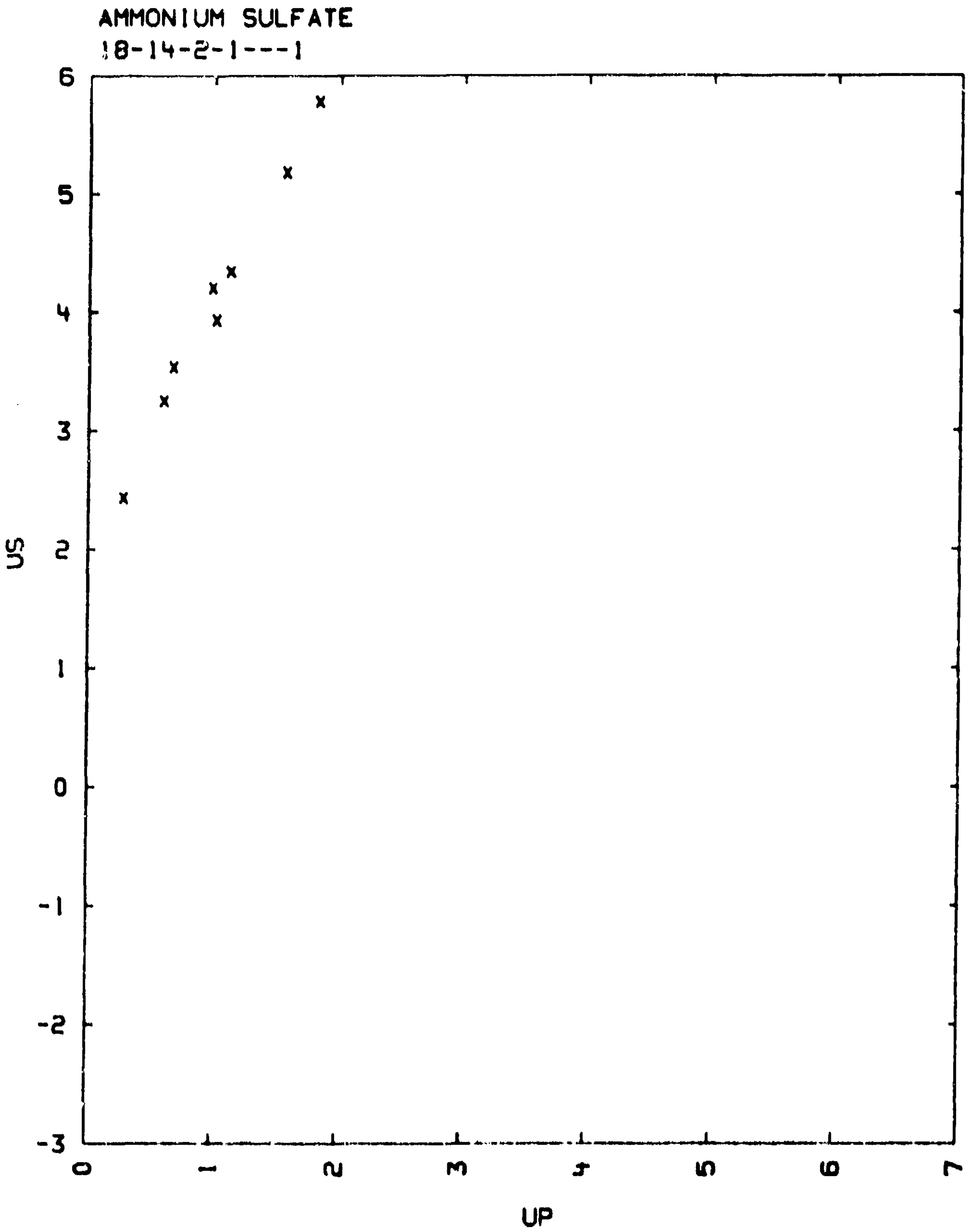
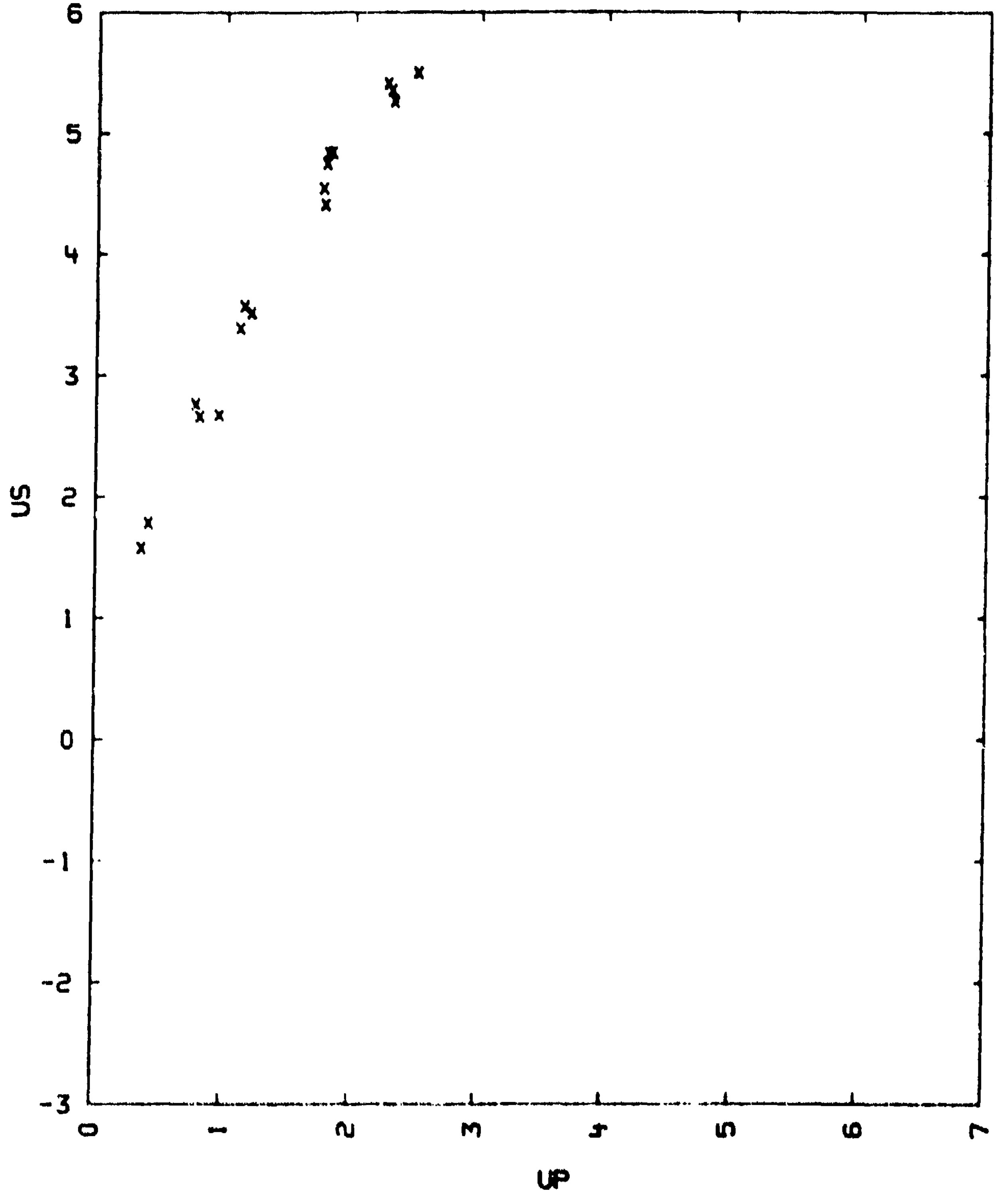


TABLE III

AMMONIUM SULFATE

18-14-2-1---1



23-1---1
CARBON DIOXIDE

C-O2

TO = 195 DEGREES KELVIN
VO = .649 CC/G

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN MM/MICROSEC, AND PRESSURE IN KILOBARS.

TABLE

US	UP	P	V/VO
3.57	1.03	53.4	.755
5.38	2.14	167	.641
7.71	3.68	412	.556
9.05	4.79	631	.497

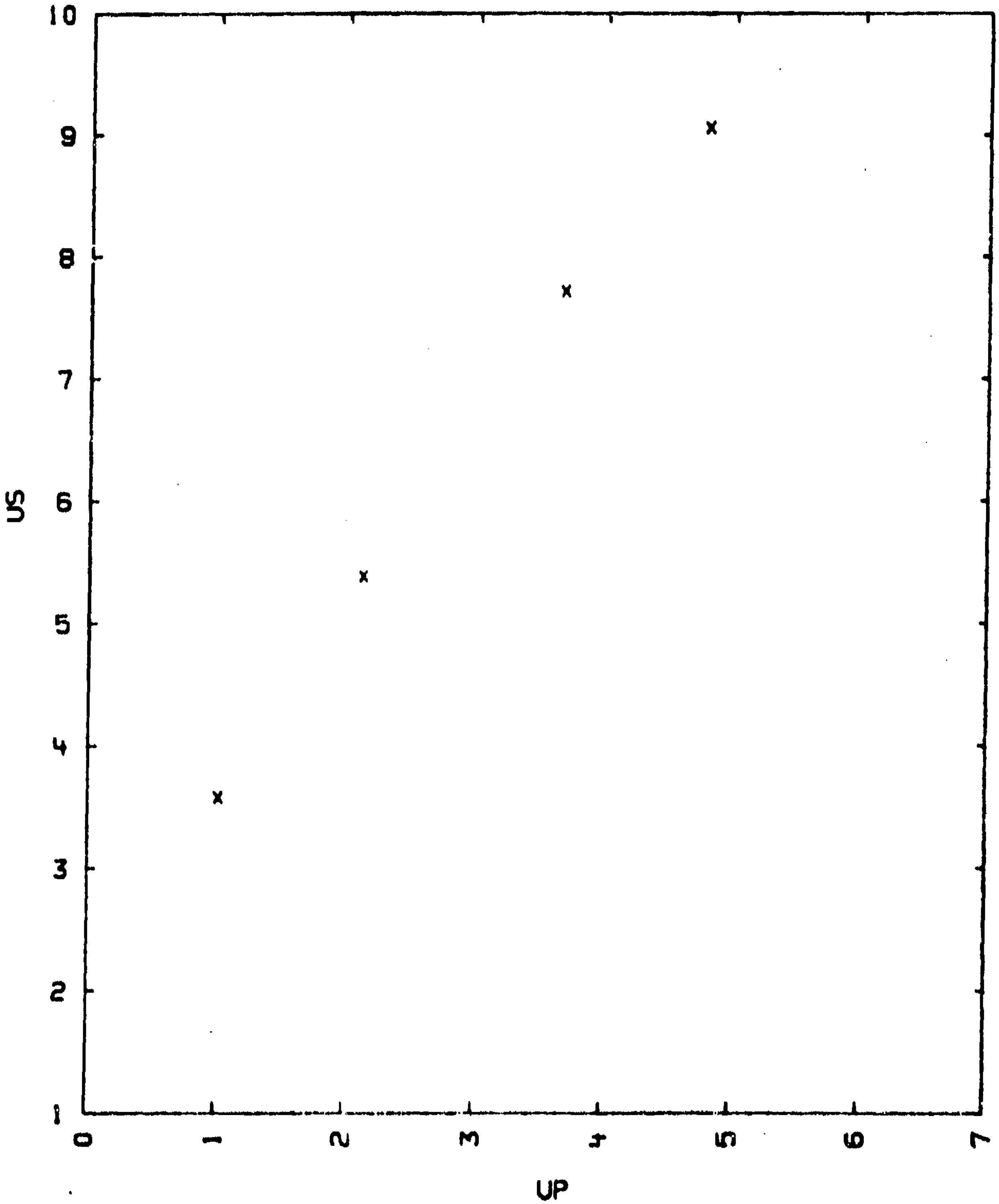
US = 1.65 + 1.93*UP - 0.080*UP**2 KM/SEC, SIG.US=0.055

COMMENTS:

1) SOURCE: ZUBAREV, V.N. AND TELEGIN, G.S.
SOVIET PHYS.-DOKLADY, VOL. 7, P. 34 (1962)
2) EXPERIMENTAL TECHNIQUE A
DATA REDUCTION TECHNIQUE B
(THE ADIABAT AND HUGONIOT ARE ASSUMED IDENTICAL)
3) EACH POINT IS AN AVERAGE OF 4 TO 12 MEASUREMENTS WITH A MEAN SQUARE DEVIATION OF 1 TO 2 PERCENT.

TABLE I

CARBON DIOXIDE
23-1---1



23-10---1
CARBONTETRACHLORIDE

C-CL4 99+ WT. PERCENT

T0 = 12 TO 30 DEG. C. C0(22 DEG. C.) = 0.03 KM/SEC.
V0 = 0.6211 TO 0.6353 CC/G.

THE TABLE LISTS TEMPERATURE IN DEG. C., DENSITY IN G/CC., VELOCITIES IN KM/SEC. AND PRESSURE IN KBAR. DUS AND DUP ARE THE UNCERTAINTIES IN US AND UP

TABLE

SAMPLE								STANDARD	
T	RHOO	US	DUS	UP	DUP	P	V/V0	US(ST)	DUS(ST)
22	1.590	2.32	0.01	0.58	0.08	21.	0.752	5.93	0.07
29	1.577	2.27	0.01	0.69	0.04	25.	0.697	6.02	0.03
28	1.571	2.47	0.01	0.69	0.04	27.	0.722	6.02	0.04
28	1.571	2.79	0.01	0.82	0.02	36.	0.702	6.16	0.04
24	1.586	2.91	0.01	0.90	0.03	41.	0.692	6.22	0.03
20	1.594	2.95	0.01	0.90	0.04	42.	0.694	6.23	0.03
19	1.596	3.28	0.01	1.12	0.03	59.	0.658	6.43	0.02
32	1.571	3.32	0.01	1.20	0.02	63.	0.637	6.50	0.02
14	1.606	3.46	0.01	1.20	0.03	67.	0.652	6.52	0.02
22	1.591	3.44	0.01	1.23	0.02	67.	0.643	6.54	0.02
18	1.598	3.50	0.01	1.33	0.08	74.	0.621	6.62	0.07
29	1.577	3.74	0.01	1.49	0.02	88.	0.601	6.78	0.02
29	1.571	3.86	0.01	1.57	0.01	95.	0.594	6.86	0.01
14	1.606	4.08	0.01	1.61	0.05	106.	0.604	6.92	0.04
27	1.580	4.07	0.01	1.65	0.02	106.	0.596	6.95	0.02
28	1.571	4.27	0.03	1.86	0.09	125.	0.565	7.14	0.08
28	1.571	4.52	0.01	1.96	0.02	140.	0.566	7.26	0.01
24	1.586	4.66	0.01	2.00	0.02	148.	0.572	7.31	0.02
19	1.596	4.71	0.01	2.04	0.04	153.	0.566	7.35	0.03
30	1.574	4.88	0.01	2.26	0.03	174.	0.537	7.56	0.03
12	1.610	5.34	0.02	2.46	0.03	211.	0.540	7.80	0.03
27	1.580	5.21	0.01	2.53	0.02	208.	0.515	7.83	0.02
23	1.588	5.72	0.03	2.87	0.07	260.	0.499	8.20	0.06
28	1.571	5.69	0.02	2.98	0.05	266.	0.477	8.29	0.05
28	1.571	6.13	0.03	3.13	0.03	303.	0.489	8.48	0.03
25	1.584	6.44	0.05	3.37	0.09	344.	0.478	8.74	0.08
19	1.598	6.80	0.02	3.56	0.04	387.	0.476	8.97	0.04
26	1.582	6.72	0.02	3.62	0.02	384.	0.461	9.00	0.06
27	1.500	6.78	0.03	3.70	0.09	396.	0.455	9.08	0.08
24	1.586	7.13	0.03	3.98	0.06	450.	0.441	9.39	0.05
23	1.588	7.55	0.02	4.34	0.06	520.	0.425	9.77	0.06
23	1.588	7.98	0.03	4.52	0.06	572.	0.432	10.00	0.06
18	1.598	8.06	0.06	4.69	0.13	604.	0.418	10.17	0.12
27	1.580	8.24	0.04	4.69	0.11	610.	0.431	10.18	0.10
25	1.584	8.26	0.03	4.79	0.10	626.	0.421	10.28	0.09

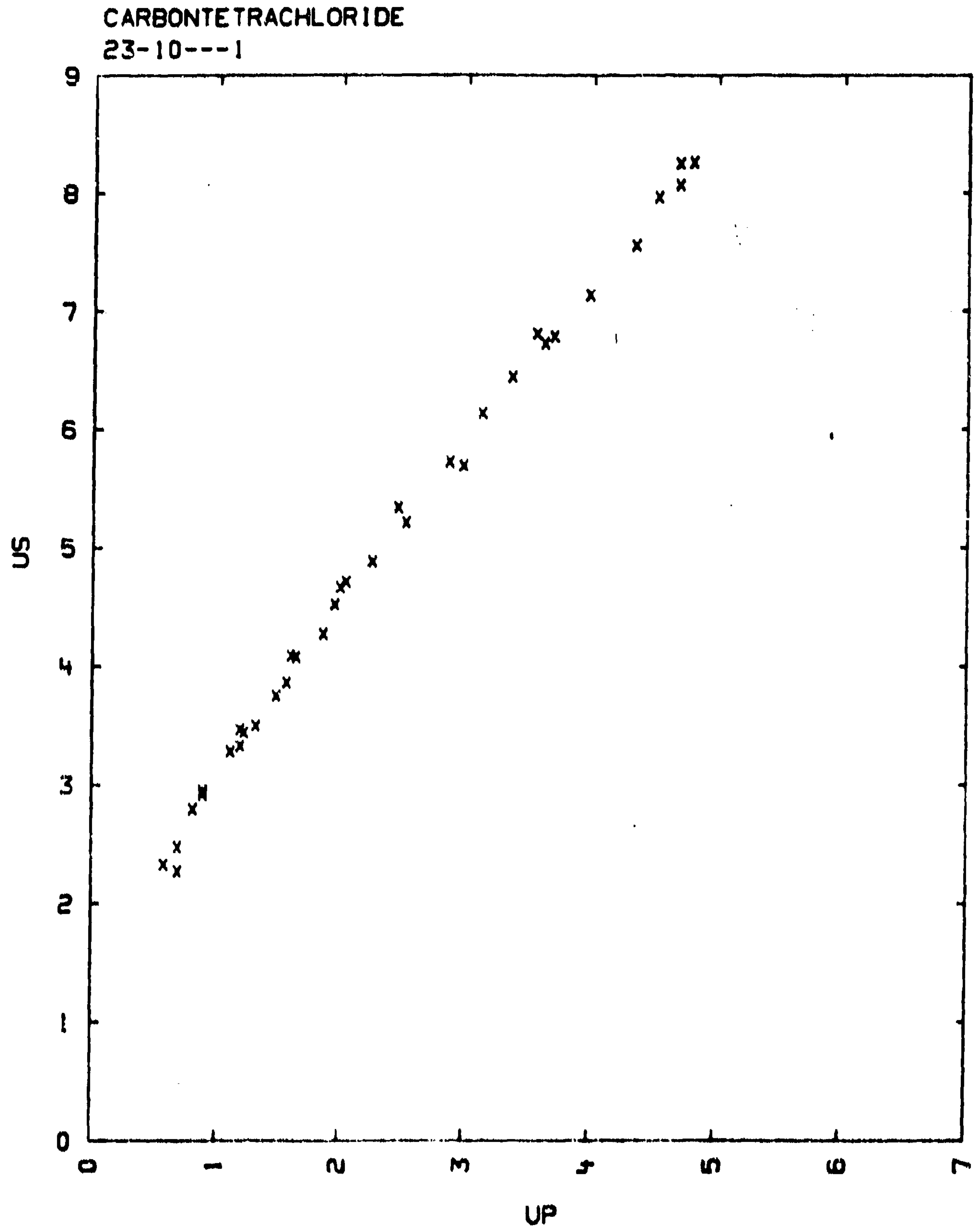
US = A + B*UP, WITH A = 1.47 KM/SEC. B = 1.57
SIG.A = 0.05 KM/SEC. SIG.B = 0.03
FOR US BETWEEN 2.3 AND 4.7 KM/SEC. AND

A = 1.97 KM/SEC   B = 1.31
SIG.A = 0.13 KM/SEC   SIG.B = 0.03
FOR US GREATER THAN 4.7 KM/SEC.

COMMENTS:

1) SOURCE: DICK, R. D.
   LOS ALAMOS SCIENTIFIC LAB. (THESIS)
   LOS ALAMOS SCIENTIFIC LAB.,
   LOS ALAMOS, BOX 1663, NEW MEXICO 87544
2) EXPERIMENTAL TECHNIQUE: A
   DATA REDUCTION TECHNIQUE: B STANDARD MATERIAL 2024 AL ALLOY WITH
   US = 5.460 + 1.318*UP RHOO = 2.785G/CC
   AND GRUNEISEN GAMMA = 2.22
3) THE SOUND SPEED CO HAS A DENSITY DEPENDENCE GIVEN BY M(VO)((CO)**1/3)
   =S, WHERE S IS 94.41, 94.34 AND 94.58 AT 10, 30 AND 50 DEG.C. RESP.
   AND M=MOLECULAR WEIGHT. BERGMANN L., DER ULTRASCHALL (S. HIRZEL
   VERLAG, STUTTGART, 1954).

TABLE I



23-10---2
CARBON TETRACHLORIDE

C-CL4

TO = 22-25 DEG. CENTIGRADE
VO = 0.629-0.634 CC/G. CO = 0.940-0.930 KM/SEC

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN KM/SEC., PRESSURE IN KILOBARS, DENSITY IN G/CC, AND TEMPERATURE IN DEG. CENTIGRADE.

TABLE

TO	RHOO	US	UP	P	V/VO
25	1.577	4.85	2.235	171.0	0.539
22	1.590	3.51	1.325	73.9	0.622

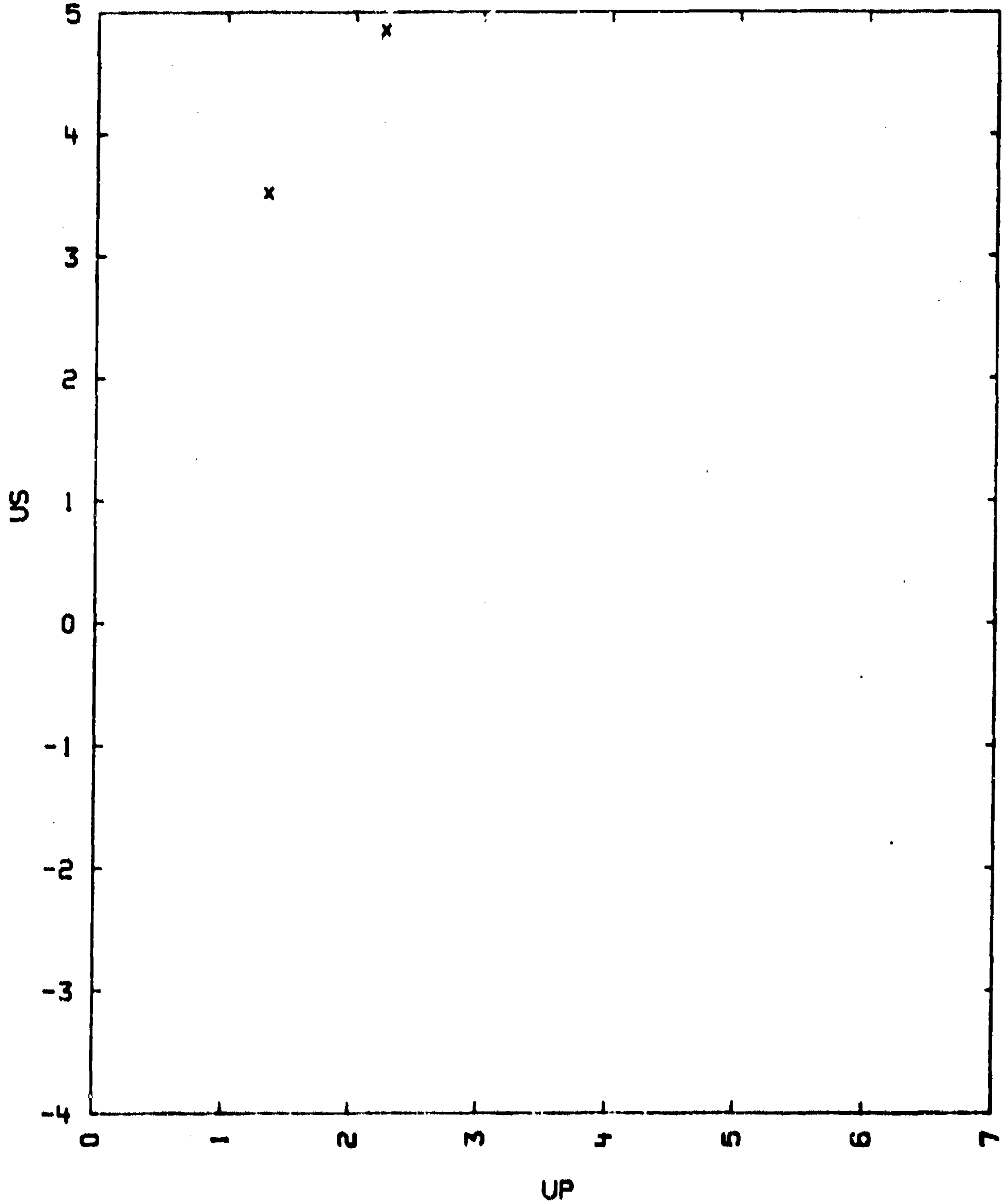
US =

COMMENTS

1) SOURCE: WALSH J. M. AND RICE M. H.
JOURNAL OF CHEMICAL PHYSICS, VOL. 26, P. 815 (1957)
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION TECHNIQUE B
STANDARD MATERIAL 24ST ALUMINUM
3) THE VALUES FOR CO WERE DETERMINED BY INTERPOLATION OF DATA POINTS OBTAINED FROM THE AMERICAN INSTITUTE OF PHYSICS HANDBOOK, (MCGRAW-HILL BOOK CO., N. Y. 1963) 2ND ED.

TABLE I

CARBON TETRACHLORIDE
23-10---2



23-10---3
CARBON TETRACHLORIDE

C-CL4

TO = 10-44 DEG.CENTIGRADE
VO = 0.6188- 0.6502 CC/G

IN THE TABLE BELOW, TEMPERATURE IS GIVEN IN DEGREE CENTIGRADE, DENSITY IN G/CC, VELOCITIES IN KM/SEC., AND PRESSURE IN KILOBARS.

TABLE

---SAMPLE---						STANDARD
TO	RHOO	US	UP	P	V/VO	US
18	1.598	4.75	2.17	164	0.543	7.45
38	1.554	4.48	1.98	138	0.558	7.20
42	1.545	4.03	1.67	104	0.586	6.90
44	1.538	3.72	1.46	83.5	0.608	6.67
41	1.548	3.50	1.28	68.5	0.637	6.48
35	1.560	3.82	1.56	93.0	0.592	6.75
10	1.616	4.33	1.90	133	0.561	7.16
32	1.568	3.97	1.58	98.4	0.602	6.77
38	1.554	4.78	2.17	160	0.544	7.43
27	1.584	3.53	1.35	75.5	0.618	6.56

US = 1.62 + 1.44*UP KM/SEC.   SIGMA UP = 0.04 KM/SEC.

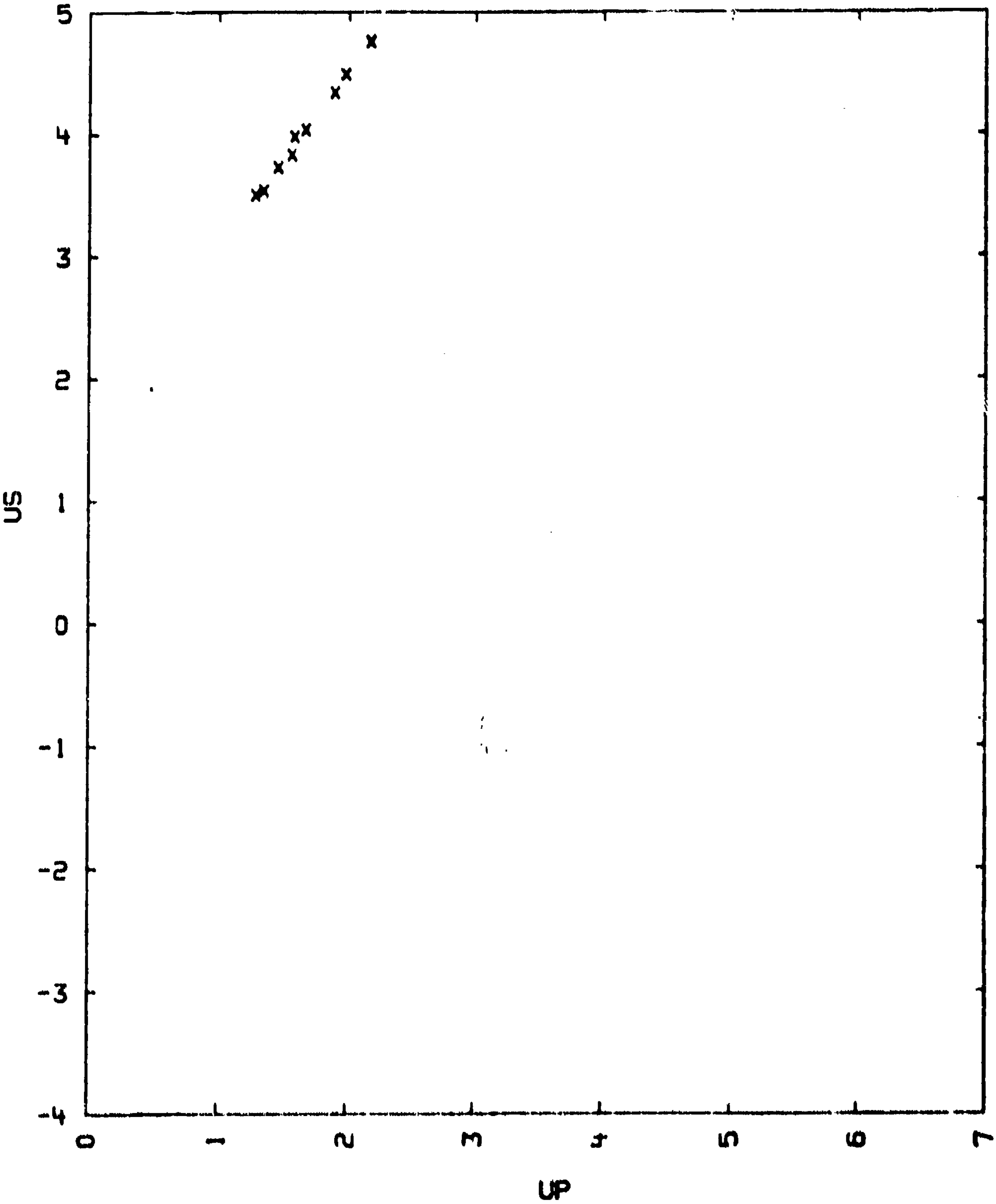
COMMENTS:

1) SOURCE: MITCHELL A.C. AND KEELER R.N.
PRIVATE COMMUNICATION (1967)
REVIEW OF SCIENTIFIC INSTRUMENTS (TO BE PUBLISHED).
2) EXPERIMENTAL TECHNIQUE A
DATA REDUCTION TECHNIQUE B
STANDARD MATERIAL 2024 ALUMINUM, WHERE US = 5.355 + 1.345*UP KM/SEC.
SEE MATERIAL 29---6.
RHOO = 2.785 +OR- 0.003 G/CC.
3) THE EXPERIMENTAL UNCERTAINTY OF THE MEASURED SHOCK VELOCITIES IS WITHIN 1 PERCENT. THE UNCERTAINTY OF CARBON TETRACHLORIDE PRESSURE DETERMINATIONS ARE BETWEEN 3-5 PERCENT.
4) IN THE ABOVE TABLE, ALL THE EXPERIMENTS WITH THE EXCEPTION OF THE LAST ENTRY HAD EXPLOSIVE IN CONTACT WITH THE BASE PLATE. THE LAST ENTRY WAS OBTAINED USING A SLOW VELOCITY ALUMINUM FLYING PLATE.
5) REAGENT GRADE CARBON TETRACHLORIDE WAS USED. THE SAMPLE DENSITY AT 25 DEG. CENTIGRADE WAS 1.584 +OR- 0.001 G/CC.
6) PERCENT DENSITY CHANGE WAS CALCULATED USING THE FOLLOWING EXPRESSION:
V(T) = VO(1 + AT + B(T**2) + C(T**3))
WHERE VO IS THE VOLUME AT 0 DEG. CENTIGRADE
A = 1.18389*10**(-3)
B = 0.09881*10**(-6)
C = 1.35135*10**(-8)

HANDBOOK OF CHEMISTRY AND PHYSICS (THE CHEMICAL RUBBER PUBLISHING CO. CLEVELAND, OHIO, 1962-1963) 44TH ED.

TABLE I

CARBON TETRACHLORIDE
23-10---3



23-14---1
CARBON DISULFIDE

C-S2

TO = 17-33 DEG. CENTIGARDE
VO = 0.805-0.815 CC/G   CO = 1.12-1.17 KM/SEC.

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN KM/SEC., PRESSURE IN KILOBARS, DENSITY IN G/CC. AND TEMPERATURE IN DEG. CENTIGRADE.

TABLE

TO	RHOO	US	UP	P	V/VO
33	1.243	4.32	2.412	129.5	0.441
17	1.227	3.37	1.415	58.5	0.580

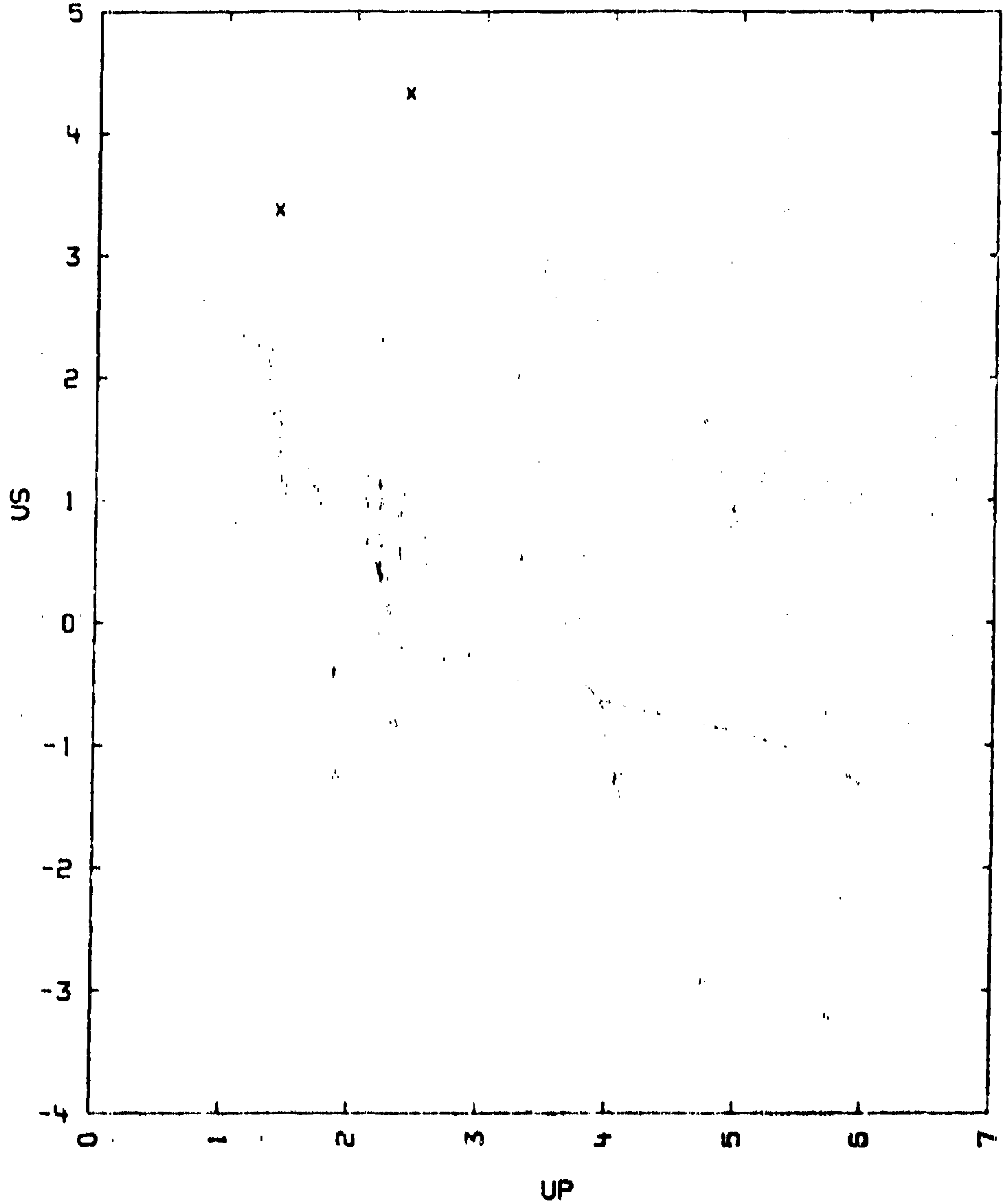
US =

COMMENTS:

1) SOURCE: WALSH J. M. AND RICE M. H.
JOURNAL OF CHEMICAL PHYSICS, VOL. 26, P. 815 (1957)
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION TECHNIQUE B
STANDARD MATERIAL 24ST ALUMINUM
3) THE VALUES FOR CO WERE DETERMINED BY INTERPOLATING THE DATA POINTS OBTAINED FROM THE AMERICAN INSTITUTE OF PHYSICS HANDBOOK, (MCGRAW-HILL BOOK CO., N. Y. 1963) 2ND ED.

TABLE 1

CARBON DISULFIDE
23-14---1



23-14---2
CARBON DISULFIDE

C-S2 99+ WT. PERCENT

T0 = 12 TO 13 DEG. C. C0(22 DEG. C.) = 1.18 KM/SEC.
V0 = 0.784 TO 0.801 CC/G

THE TABLE LISTS TEMPERATURE IN DEG. C., VELOCITIES IN KM/SEC., DENSITY IN G/CC. AND PRESSURE IN KBAR. DUS AND DUP ARE THE UNCERTAINTIES IN US AND UP

TABLE

- - - - - - - - - SAMPLE							- - - - - - - - - - - - -	- STANDARD -	
T	RHO0	US	DUS	UP	DUP	P	V/V0	US(ST)	DUS(ST)
22	1.260	2.47	0.01	0.59	0.08	18.5	0.761	5.93	0.07
29	1.249	2.41	0.01	0.71	0.04	21.	0.705	6.02	0.03
28	1.251	2.59	0.01	0.71	0.05	23.	0.727	6.02	0.04
28	1.251	2.94	0.01	0.86	0.03	32.	0.707	6.16	0.04
24	1.257	3.06	0.01	0.93	0.03	36.	0.696	6.22	0.03
20	1.263	3.09	0.01	0.94	0.04	36.	0.697	6.23	0.03
19	1.264	3.39	0.01	1.17	0.03	50.	0.655	6.43	0.02
32	1.245	3.43	0.01	1.26	0.02	54.	0.634	6.50	0.02
14	1.272	3.47	0.01	1.26	0.01	56.	0.636	6.52	0.02
22	1.260	3.47	0.01	1.29	0.02	56.	0.628	6.54	0.02
18	1.266	3.51	0.01	1.39	0.08	62.	0.603	6.62	0.07
29	1.249	3.52	0.01	1.59	0.03	70.	0.549	6.78	0.02
29	1.249	3.55	0.01	1.68	0.01	74.	0.527	6.86	0.01
14	1.272	3.65	0.01	1.74	0.05	81.	0.523	6.02	0.04
27	1.253	3.62	0.01	1.78	0.02	81.	0.507	6.95	0.02
28	1.251	3.78	0.01	2.01	0.10	95.	0.468	7.14	0.08
28	1.251	4.02	0.01	2.13	0.02	107.	0.471	7.26	0.01
24	1.257	4.18	0.00	2.17	0.02	114.	0.481	7.31	0.02
19	1.264	4.20	0.01	2.22	0.04	118.	0.473	7.35	0.03
30	1.248	4.40	0.01	2.45	0.03	134.	0.444	7.56	0.03
12	1.275	4.86	0.02	2.67	0.03	165.	0.451	7.80	0.03
27	1.253	4.80	0.01	2.73	0.02	164.	0.432	7.83	0.02
23	1.258	5.23	0.02	3.11	0.08	204.	0.406	8.20	0.06
28	1.251	5.20	0.02	3.22	0.06	209.	0.382	8.28	0.05
28	1.251	5.68	0.03	3.39	0.03	241.	0.403	8.48	0.03
25	1.255	6.04	0.03	3.64	0.03	276.	0.398	8.74	0.08
19	1.266	6.46	0.02	3.84	0.04	314.	0.406	8.97	0.04
26	1.254	6.36	0.02	3.90	0.07	311.	0.388	9.00	0.06
27	1.253	6.44	0.04	3.98	0.09	321.	0.383	9.08	0.08
24	1.257	6.73	0.03	4.30	0.09	364.	0.361	9.39	0.05
23	1.258	7.34	0.04	4.65	0.07	429.	0.368	9.77	0.06
23	1.256	7.64	0.05	4.87	0.07	468.	0.362	10.00	0.08
18	1.266	7.83	0.03	5.03	0.14	499.	0.357	10.17	0.12
27	1.253	7.98	0.08	5.03	0.12	503.	0.370	10.18	0.10
25	1.255	8.09	0.05	5.12	0.11	520.	0.367	10.28	0.09

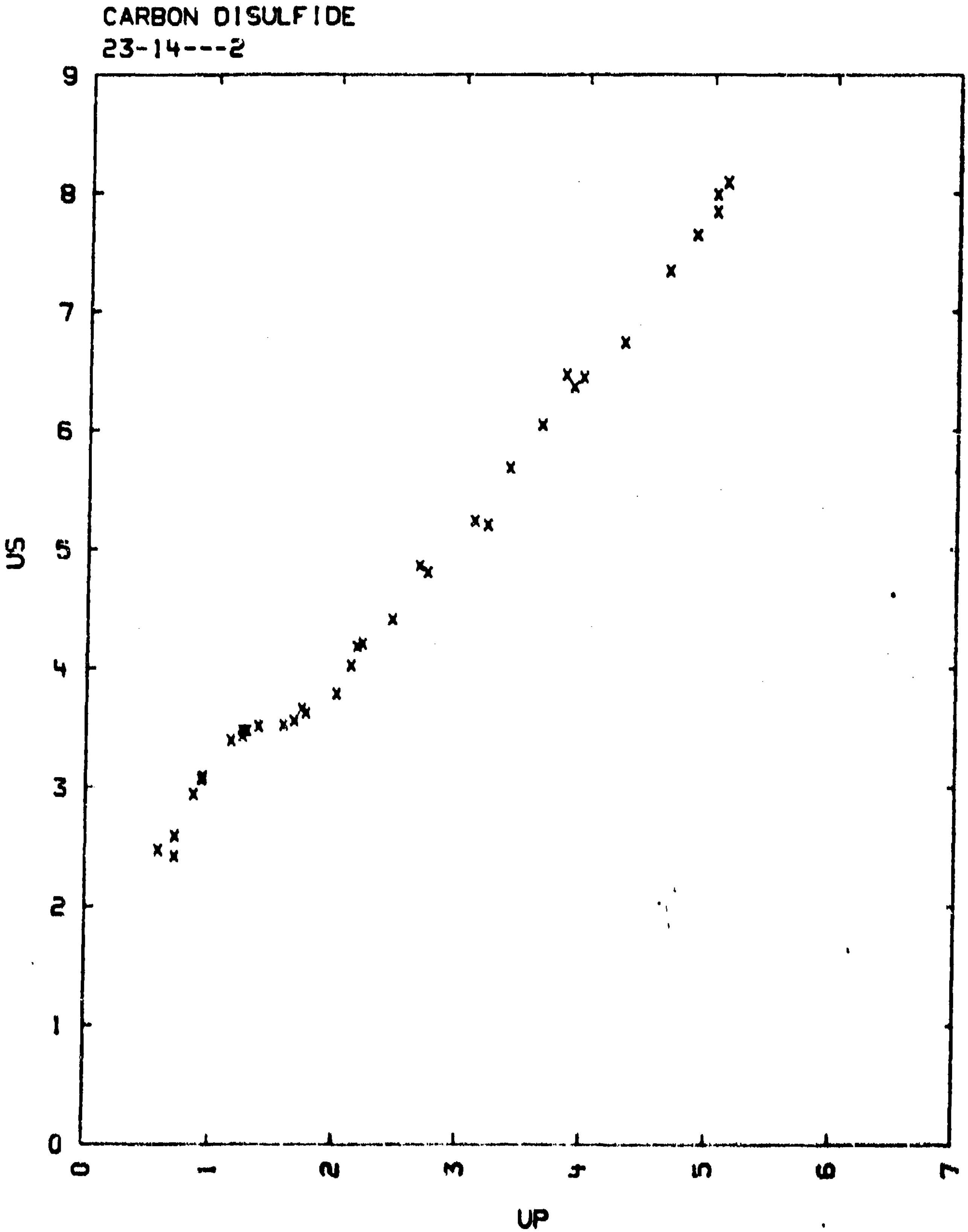
US = A + B*UP WITH A = 1.64 KM/SEC. B = 1.48
SIG.A = 0.08 KM/SEC. SIG.B = 0.08
FOR US BETWEEN 2.4 AND 3.5 KM/SEC. AND

A = 1.25 KM/SEC. B = 1.32
SIG.A = 0.06 KM/SEC. SIG.B = 0.02
FOR US BETWEEN 3.5 AND 8.1 KM/SEC.

COMMENTS:

1) SOURCE: DICK, R.D.
LOS ALAMOS SCIENTIFIC LAB. (THESIS)
LOS ALAMOS SCIENTIFIC LAB.,
LOS ALAMOS, BOX 1663, NEW MEXICO 87544
2) EXPERIMENTAL TECHNIQUE: A
DATA REDUCTION TECHNIQUE: B STANDARD MATERIAL 2024 AL ALLOY WITH
US = 5.460 + 1.318*UP RHOO = 2.785G/CC
AND GRUNEISEN GAMMA = 2.22

TABLE I



24-1---0
QUARTZ SUMMARY

SI-02

VO = 0.3774 - 0.625 CC/G
VOI= 0.3774 CC/G

THE TABLE LISTS THE HUGONIOT POINTS CALCULATED FROM THE FIT GIVEN BELOW. UNITS ARE G/CC, KM/SEC, KBAR AND KBAR.CC/G FOR THE ENERGY DIFFERENCE.

TABLE

RHOO	US	UP	P	V/VO	E-EO
2.65	5.982	2.5	396.	0.582	31.2
-	6.869	3.0	546.	0.563	45.0
-	7.734	3.5	717.	0.547	61.2
-	8.576	4.0	909.	0.534	80.0
-	10.194	5.0	1351.	0.509	125.
-	11.722	6.0	1864.	0.488	180.
-	12.453	6.5	2145.	0.478	211.
2.204	5.175	2.5	285	0.517	31.2
-	5.976	3.0	395	0.498	45.0
-	6.755	3.5	521	0.482	61.2
-	7.512	4.0	662	0.468	80.0
1.60	4.631	2.5	185.	0.460	31.2
-	5.316	3.0	255.	0.436	45.0
-	5.979	3.5	335.	0.415	61.2
-	6.620	4.0	424.	0.395	80.0

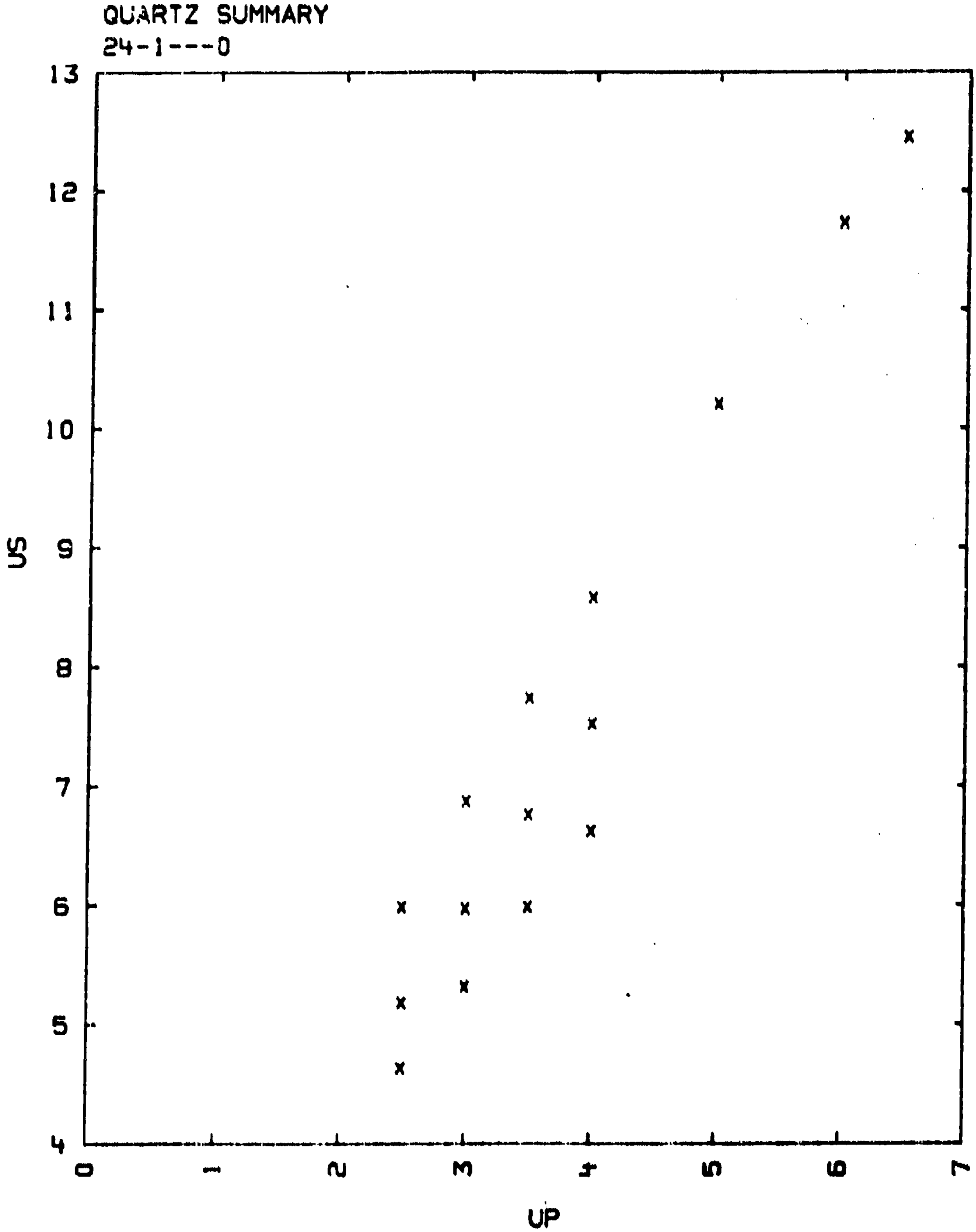
US = 1.214 + 2.019*UP - 0.044*UP**2 - 1.237(2.65-RHOO) +
+ 0.866(2.65-RHOO)**2 - 0.383(2.65-RHOO)UP
FOR UP BETWEEN THE LIMIT OF THE TABLE
SIG.US = 0.11 KM/SEC

COMMENTS:

1) SOURCE: COMPILER
2) DATA OF 24-1---4,5,6 AND 7 ARE USED IN THIS SUMMARY. THE UP**2 TERM IS CAUSED BY THE HIGHEST PRESSURE POINT OF 24-1---6 ONLY. WEIGHTS OF 4 WERE GIVEN TO THE DATA OF 24-1---4, 3 TO THOSE OF 24-1---5, 4 AND 2 TO 24-1---6, 1 TO 24-1---7 . ONLY THE DATA IN THE (HIGH PRESSURE) STISHOVITE PHASE ARE USED.
3) AT LOWER PRESSURE AN ELASTIC PRECURSOR WHOSE STRESS (PRESSURE) LEVEL DEPENDS ON THE MAIN WAVE APPEARS. THIS PHENOMENON COMPLICATES THE ANALYSIS. INITIALLY POROUS SAMPLES ARE IN ADDITION QUITE NONUNIFORM AT THESE LOW PRESSURES DUE TO THE HIGH DYNAMIC STRENGTH OF QUARTZ.
4) GOOD REPRESENTATIONS OF LOW PRESSURE DYNAMIC PROPERTIES HOWEVER ARE STILL OBTAINABLE FROM 24-1---1 AND 7 FOR POROUS SAMPLES AND FROM 24-1---4 AND 5 FOR SINGLE CRYSTAL AND FUSED SAMPLES.
5) THE SOUNDSPEED OF STISHOVITE IS: CL = 11.01 KM/SEC

CS = 6.29 -
CO = 8.26 - AT RHOO=4.287 G/CC
D.H. CHUNG: AMERICAN GEOPHYS UNION, TRANS., V.54, P.475, (1973)
THE EXPANSION COEFFICIENTS BETWEEN T = 0 AND 600 DEG. C. ARE:
(1/L)*DL/DT =(4.9 + 0.12*T)*10**-6 PER DEG. (A AXIS)
(1/L)*DL/DT =(-.8 + .014*T)*10**-6 PER DEG. (C AXIS)
(1/V)*DV/DT =(8.9 + .038*T)*10**-6 PER DEG.
WHERE THE UNCERTAINTIES ARE BETWEEN 0.5 AND 1.5 FOR THE FIRST TERM
AND BETWEEN 0.021 AND 0.023 FOR THE SECOND.
J. SCOTT WEAVER ET ALL 1810

TABLE I



24-1---1
SANDSTONE COCONINO

QUARTZ	SI-O2	97 PERCENT BY WEIGHT
MICROCLINE (ORTHOCLASE)	K-AL(SI3-O8)	3 PERCENT BY WEIGHT
POROSITY		24 PERCENT
GRAIN SIZE		.12 TO .15 MM

V0 = .5099 CC/G
V0I = .378 CC/G

TABLE I LISTS THE HUGONIOT VELOCITY DATA IN KM/SEC. TABLE II LISTS THE INITIAL DENSITY IN G/CC, PRESSURE IN KBAR AND COMPRESSION CORRESPONDING TO THE TABLE I ENTRIES. D STANDS FOR SAMPLE THICKNESS AND SNO IS THE SOURCE EXPERIMENT NUMBER. STM IS THE STANDARD MATERIAL: PLEXIGLAS=PLEX

TABLE I

	SAMPLE						STANDARD	
NO	US1	UFS1	UP1	US2	UFS2	UP2	UFS	STM
1				4.126	2.50	1.74	2.568	AL
2				4.039	2.24	1.53	2.206	-
3				3.285	1.95	1.26	1.77	-
4				3.141	1.63	1.11	1.54	-
5				3.321	1.88	1.08	2.46	PLEX
6				3.126	1.99	1.02	2.25	-
7	2.622	0.312	0.156	2.305	0.699	0.317	0.836	AL
8	2.853	0.148	0.074	2.385	0.499	0.371	-	-
9				4.306	4.481			
10				4.481	3.837			
11				4.600		1.98		AL
12	2.705	0.308	0.154	2.354	1.08	0.475	1.076	PLEX
13	3.027	0.172	0.086	2.357	1.22	0.500	-	-
14				4.615	2.872			
15				4.599	2.540			
16				4.833		2.041	2.872	AL
17				2.793		0.875		
18				3.11		1.09		
19				3.082		1.128		
20				4.26		1.75		
21				4.29		1.985		
22	3.080		0.085					
23	3.007		0.090					
24				2.483		0.798		
25				2.002		0.268		
26				1.601		0.068		

US2 = 1.40 + 2.65*UP KM/SEC.   SIG.US = 0.13 KM/SEC.
FOR UP BELOW 0.4 KM/SEC
US2 = 1.43 + 1.58*UP KM/SEC.   SIG.US = 0.27 KM/SEC.
FOR UP BETWEEN 0.8 AND 2. KM/SEC

TABLE II

NO	RHOO	P1	V1/V0	P2	V2/V0	D	SNO
1	1.981			144	0.567	6.32	8974
2	-			124	0.610	6.35	-
3	-			83	0.606	6.63	8975
4	-			70	0.633	6.43	-
5	-			73	0.651	6.35	8989
6	-			62	0.674	6.32	-
7	-	8.0	0.942	18	0.788	5.07	9107
8	-	4.1	0.975	18	0.788	9.29	
11	-			173	0.569	0.00*	9106
12	-	8	0.889	23.8	0.765	6.34	9208
13	-	5.1	0.971	24.9	0.709	9.58	-
16	-			186	0.559	0.00*	9342
17	2.00			48.9	0.687		8151
18	1.97			66.8	0.650		7862
19	1.975			68.2	0.632		7861
20	1.98			146	0.589		7809
21	2.00			171	0.535		8164
22	2.031	5.3	0.972				8269
23	-	5.5	0.970				-
24	2.000			39.5	0.680		8262
25	-			10.6	0.867		-
26	-			2.1	0.958		-

TABLE III

NO	US	UP	P	V/V0
27	4.86	2.15	207.	0.558
28	5.19	2.75	283.	0.470
29	5.71	2.82	317.	0.506
30	5.97	2.99	352.	0.499

US*

COMMENTS:

1) SOURCE: GREGSON, V.G., AHRENS, T.J. AND PETERSEN, C.F.
REPORT NO. AFCRL 63-662
STANFORD RESEARCH INSTITUTE, MENLO PARK, CALIFORNIA,
CATALOGUED BY DDC NO. 413819 MARCH 1963
AHRENS, T. J. AND GREGSON JR., V. G.
J. GEOPHYS. RES., VOL. 69, P. 4839 (1964)
AHRENS T.J., ROSENBERG J.T., RUDERMAN M.H.
DYNAMIC PROPERTIES OF ROCKS
PROJECT FGU-4816, REPORT DASA 1868 (SEPT. 30 1966)
STANFORD RESEARCH INSTITUTE
MENLO PARK, CALIF., USA
2) EXPERIMENTAL TECHNIQUE C1   EXCEPT FOR NO: 18 20 21 22 AND 23

USED METHOD D
IN NO: 24 25 AND 26
AN XRAY METHOD WAS USED
DATA REDUCTION METHOD B AND D WITH 2UP=UFS.

3) * INDICATES VALUES OBTAINED FROM EXTRAPOLATION OF EXPERIMENTAL SHOCK VELOCITIES TO ZERO SAMPLE THICKNESS.

4) P1 AND V1/V0 OBTAINED FROM US1 AND UP1, EXCEPT FOR LAST P1 ENTRY, WHICH WAS OBTAINED WITH A QUARTZ TRANSDUCER.
P2 AND V2/V0 WERE OBTAINED FROM THE INTERFACE CONDITION WITH BRASS AND ALUMINUM STANDARDS.

5) V01 LEADS TO A 26 PERCENT POROSITY INSTEAD OF THE 24.1 PER CENT MEASURED BY THE ABOVE SOURCE.
V01 OBTAINED FROM QUARTZ AND MICROCLINE DENSITIES GIVEN IN:
DANAS MANUAL OF MINERALOGY (JOHN WILEY AND SONS, NEW-YORK 1953) 1ST ED.

TABLE I

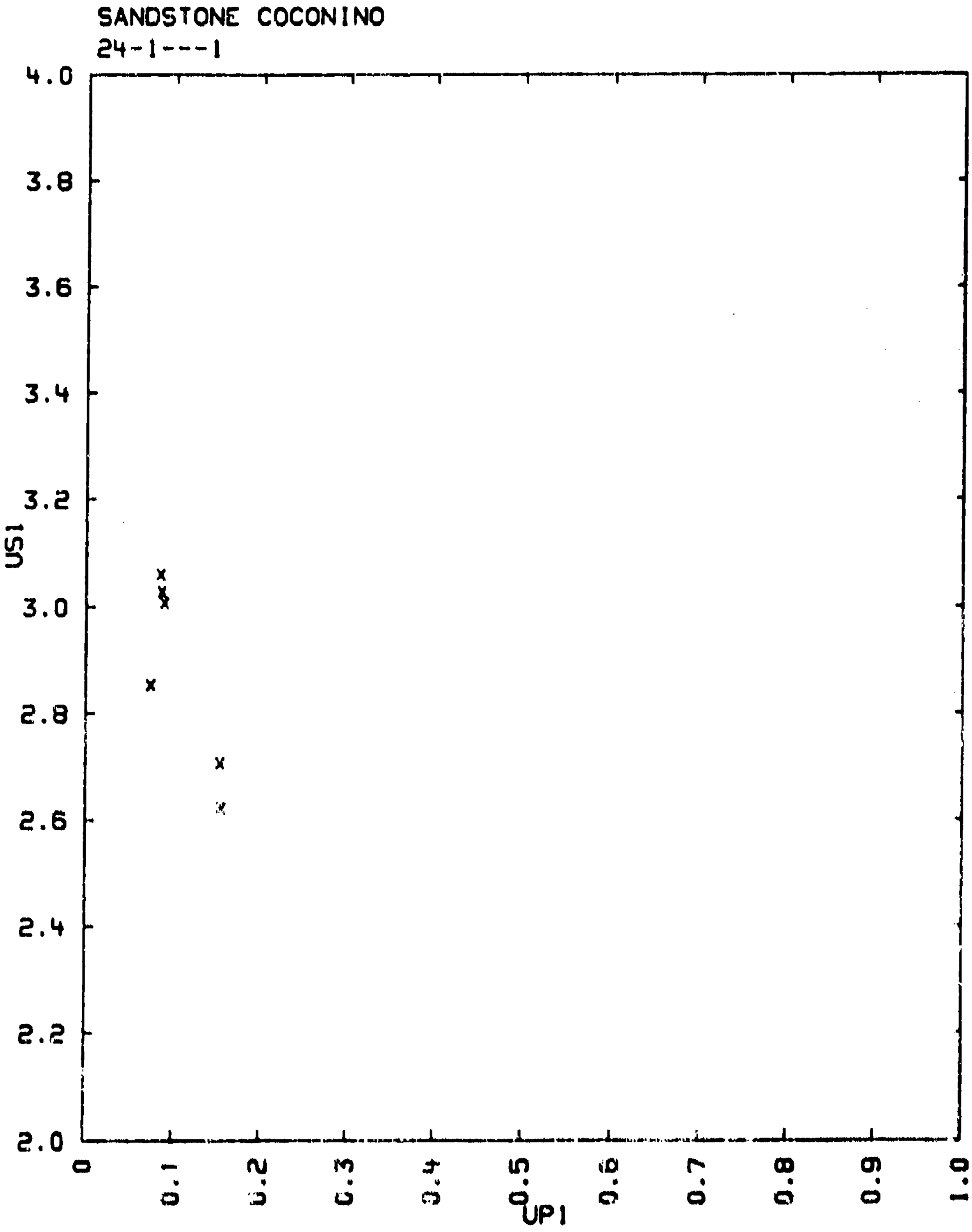

SANDSTONE COCONINO
24-1---1
4.0
3.8
3.6
3.4
3.2
3.0
2.8
2.6
2.4
2.2
2.0
US1
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
UP1

TABLE I

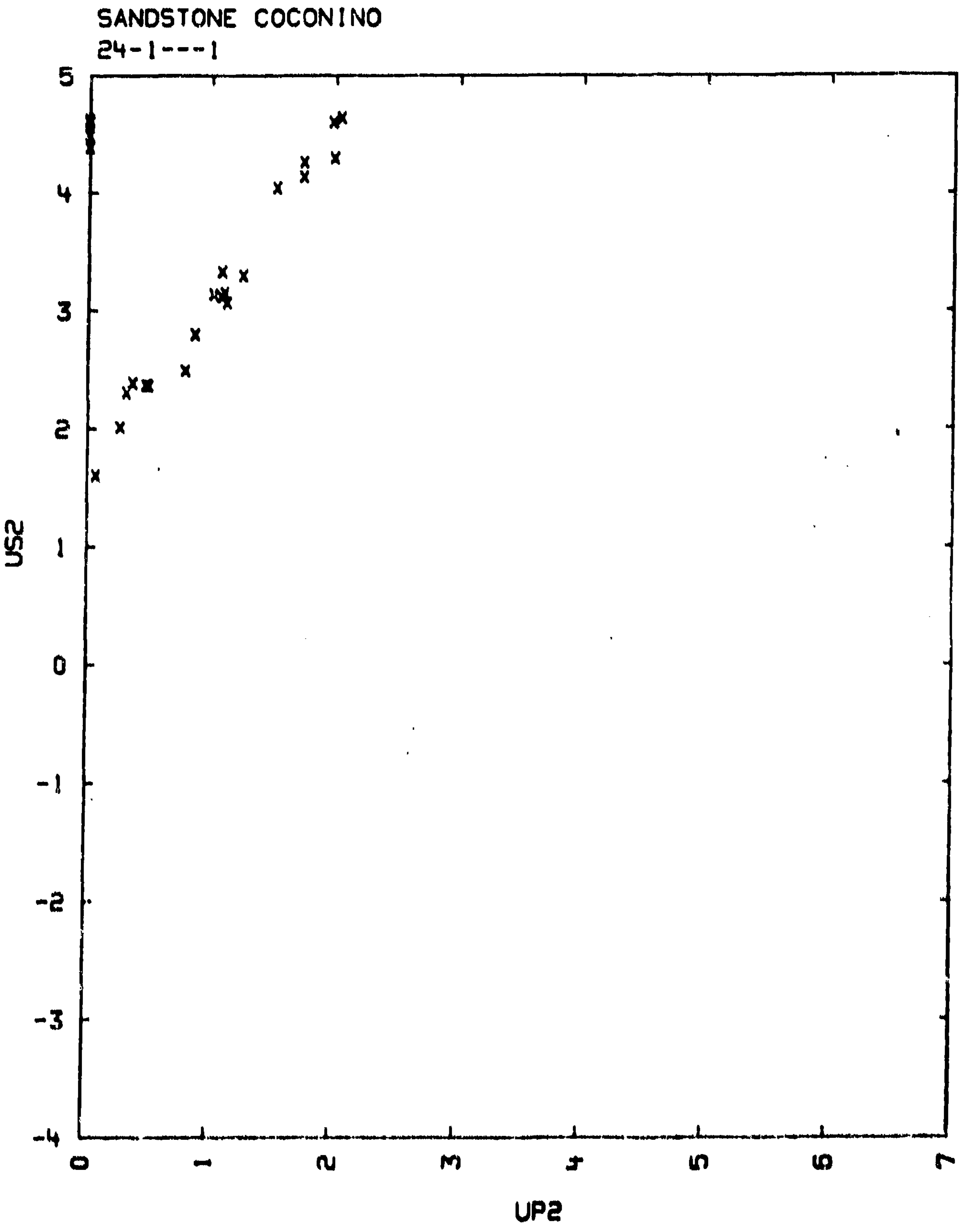
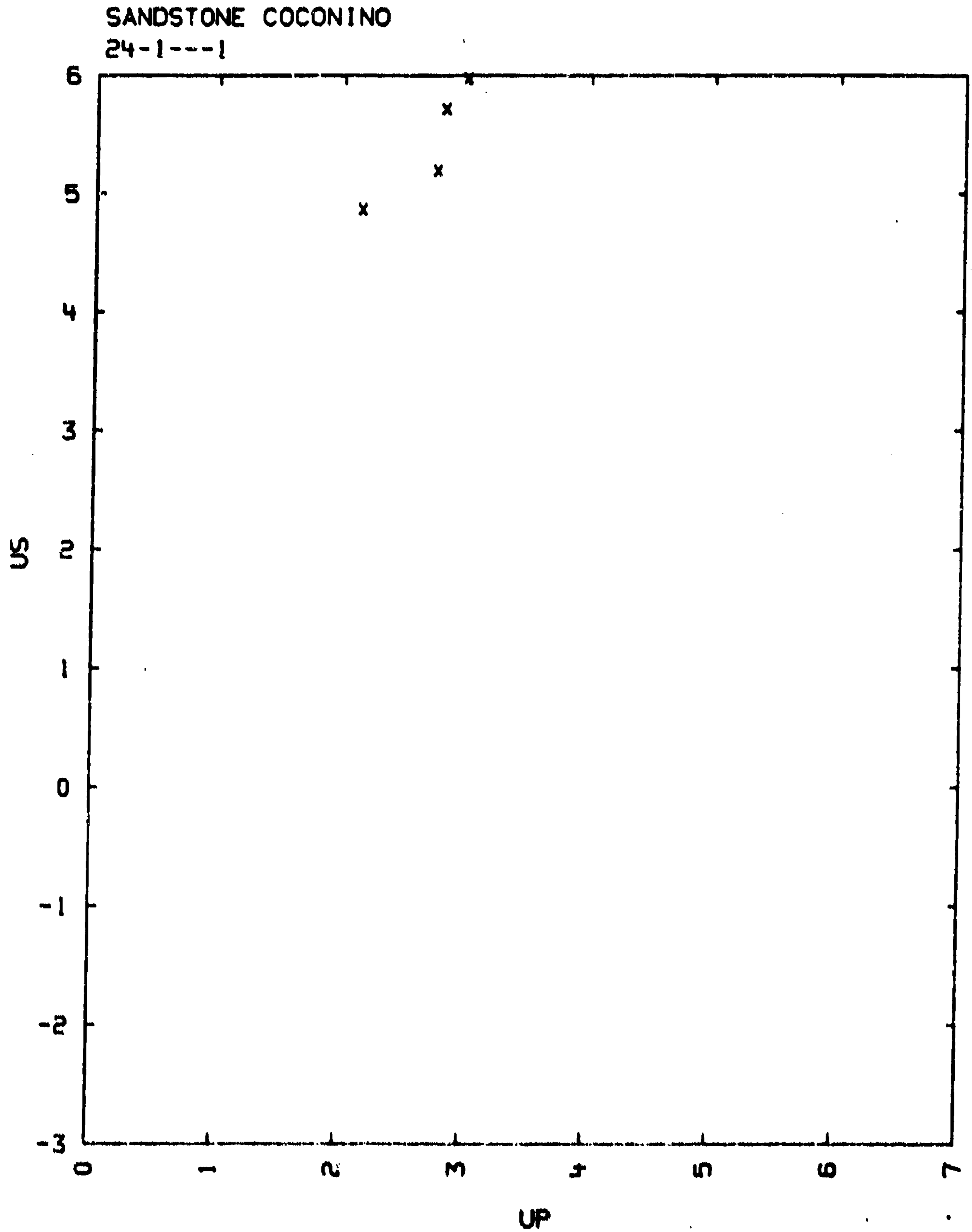


TABLE III



24-1---2
SILICA (SAND)

SILICONDIOXIDE   SI-O2   100 PERCENT
PARTICLE SIZE LESS THAN .075 MM, L. PERCENT, TO .15 MM MAXIMUM
POROSITY   41 PERCENT

VO = 0.633 CC/G

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN MM/MICRO-SEC, AND PRESSURE IN KILOBARS.

TABLE

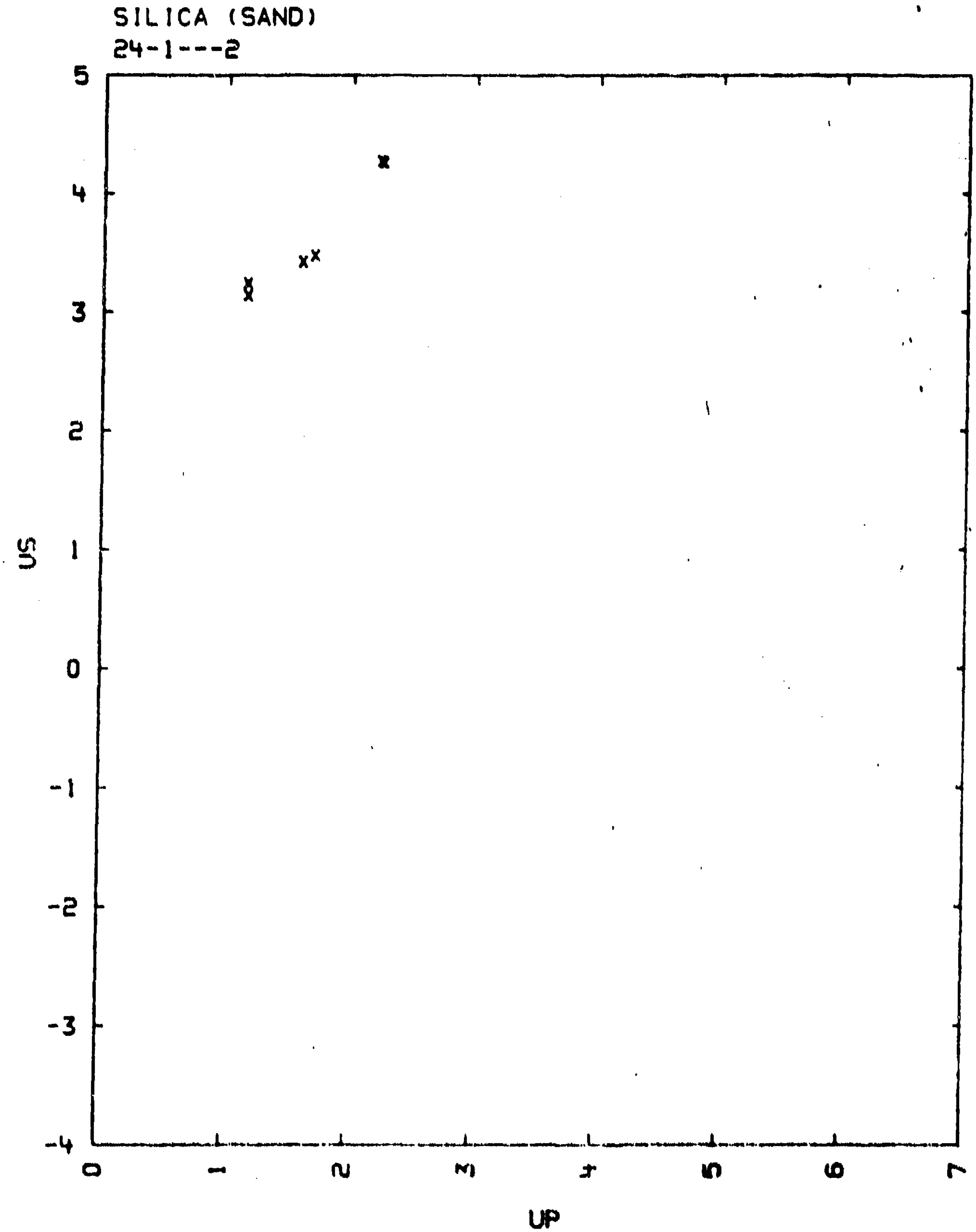
RHOO	US	UP	P	V/VO
1.58	3.13	1.17	58	.626
1.58	3.23	1.16	59	.641
1.59	3.42	1.61	88	.529
1.58	3.47	1.70	93	.510
1.56	4.26	2.25	150	.472
1.62	4.27	2.23	153	.474

US = 1.9 + 1.02 UP KM/SEC, SIG.US = 0.14 KM/SEC.

COMMENTS:

1) SOURCE: BASS, R.C., HAWK, H.L. AND CHABAI, A.J.
REPORT NO. SC-4903 RR (1963)
SANDIA CORPORATION, ALBUQUERQUE, N. M.
2) EXPERIMENTAL TECHNIQUE A
DATA REDUCTION TECHNIQUE B
TECHNIQUE USED FERRO ELECTRIC TRANSDUCERS TO MEASURE THE ARRIVAL OF SHOCK WAVES AT SAMPLE AND DRIVER PLATE SURFACES.
3) THE INTERFACE WAS MATCHED WITH THE ALUMINUM HUGONIOT REFLECTED IN THE PRESSURE - MASS VELOCITY PLANE.

TABLE I



24-1---3
SILICA (SAND)

SILICONDIOXIDE SI-02 100 PERCENT
PARTICLE SIZE: LESS THAN 0.075 MM - 80 PERCENT, TO 0.15 MM MAXIMUM.
POROSITY 22 PERCENT

V0 = 0.481 CC/G

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN MM/MICRO-SEC, AND PRESSURE IN KILOBARS.

TABLE

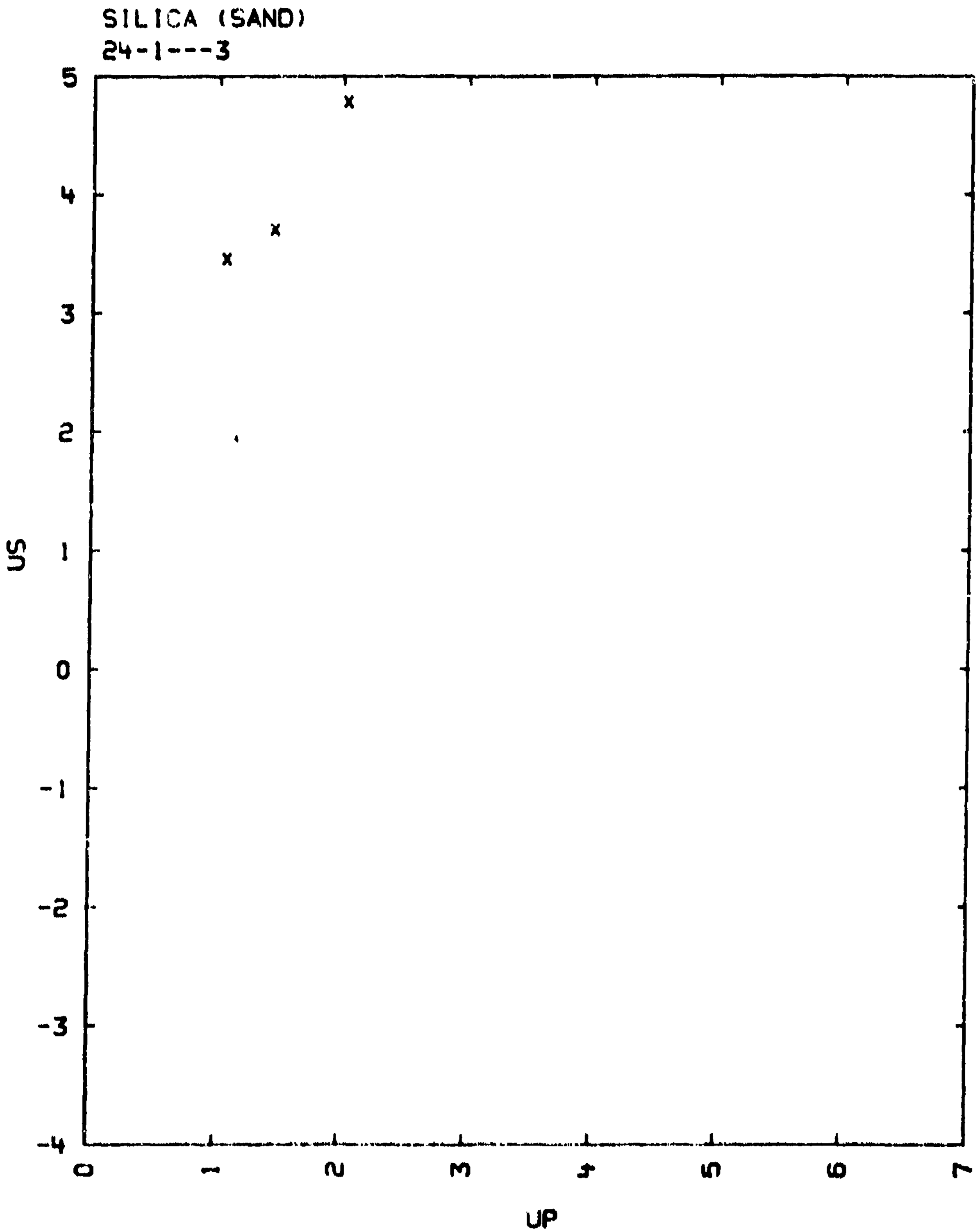
RHO0	US	UP	P	V/V0
2.02	3.45	1.07	75	.690
2.14	3.70	1.46	116	.605
2.03	4.78	2.03	197	.575

US = 1.8 + 1.42 UP KM/SEC, SIG.US = 0.24 KM/SEC.

COMMENTS:

1) SOURCE: BASS, R.C., HAWK, H.L. AND CHABAI, A.J.
REPORT NO SC-4903 RR (1963)
SANDIA CORPORATION, ALBUQUERQUE, N. M.
2) EXPERIMENTAL TECHNIQUE A
DATA REDUCTION TECHNIQUE B
TECHNIQUE USED FERROELECTRIC TRANSDUCERS TO MEASURE THE ARRIVAL OF SHOCK WAVES AT SAMPLE AND DRIVER PLATE SURFACES.
3) THE INTERFACE WAS MATCHED WITH THE ALUMINUM HUGONIOT REFLECTED IN THE PRESSURE - MASS VELOCITY PLANE.

TABLE 1



24-I---4
QUARTZ CRYSTAL

SI-02

VO = 0.377 CC/G CL (COMMENT 8) CO = 3.69 KM/SEC
VOI = 0.3774 CC/G

IN TABLE I BELOW, DENSITY IS GIVEN IN G/CC., AND VELOCITIES IN KM/SEC. FOR EXPLANATION OF DIFFERENT UPI VALUES SEE COMMENTS. CUT DESIGNATES THE CRYSTAL AXIS PERPENDICULAR TO THE SHOCK FRONT. ID IS FOR IDENTIFICATION BETWEEN THE TABLES.
IN TABLE II, PRESSURES ARE GIVEN IN KILOBARS AND VELOCITY IN KM/SEC., ST DESIGNATES THE STANDARD MATERIAL. PI IS THE PRESSURE JUST AHEAD OF WAVE 2. PL = PLEXIGLAS.

TABLE I

ID	RHOO	US1	UP1 MAX.	UP1 MIN.	UP1 AV.	US2	UP2	UFS2	CUT
1	2.65	5.89	0.33	0.275	0.285				X
2	-	5.92	0.34	0.275	0.29				-
3	-	5.93	0.37	0.29	0.32	2.88	0.43	0.84	-
4	-	6.00	0.40	0.34	0.36	4.74	0.67	1.32	-
5	-	[illegible]	0.41	0.35	0.37	5.11	0.85		-
6	-	6.07	0.44	0.40	0.415	5.24	0.82		-
7	-	6.10		0.44		5.64	1.24		-
8	-	6.12	0.52	0.48	0.50	5.69	1.69		-
9	-	5.89	0.31	0.275	0.285				-
10	-	5.94	0.34	0.285	0.305	5.14	0.82		-
11	-	5.96	0.41	0.39	0.40	5.61	1.21	1.27	-
12	-	6.03		0.35		4.74	0.71	2.20	-
13	-	6.04		0.36		5.18	0.81		-
14	-	6.1		0.45		5.61	1.28		-
15	-	6.21		0.57		5.76	1.82		-
16	-			0.61		6.12	2.55		-
17	-					6.29	2.70		-
18	-					6.66	2.89		-
19	-					6.95	3.03		-
20	-					7.70	3.52		-
21	-					7.63	3.50		-
22	-	6.19	0.49	0.44	0.455	4.85	0.86		Y
23	-	6.17	0.50	0.46	0.48	4.88	0.86		-
24	-	6.24	0.60	0.58	0.59	5.47	1.25		-
25	-	6.26	0.66	0.64	0.65	5.61	1.71		-
26	-	6.12		0.60		5.68	1.30		-
27	-					6.66	2.89		-
28	-					6.95	3.03		-
29	2.65					7.72	3.50		Y
30	-					7.75	3.52		-
31	-	6.82	0.31	0.29	0.295				Z
32	-	6.87	0.39	0.34	0.35				-
33	-	7.23	0.68	0.60	0.625				-
34	-	7.21	0.64	0.57	0.59	3.68	1.83		-
35	-	7.44	0.71	0.685	0.695	4.71	1.23		-

QUARTZ CRYSTAL

ID	RHOO	US1	UP1	UP1	UP1	US2	UP2	UFS2	CUT
36	-	7.51	0.73	0.71	0.72				-
37	-					7.76	3.42		-
38	-					7.76	3.49		-

US = A + B*UP KM/SEC

FITS OF US1 VERSUS UP1(MAX) ALONG THE PRINCIPLE AXES

	X	Y	Z
A	5.61	6.01	6.36
SIG A	0.04	0.07	0.10
B	0.89	0.32	1.36
SIG B	0.09	0.13	0.16

FITS OF US2 VERSUS UP2 X AND Y DIRECTION COMBINED

	UP<1	1<UP<2	UP>2
A	1.31	5.36	1.83
B	4.47	0.19	1.67
SIG US	0.13	0.07	0.04

FOR UP2 GREATER THAN 2 KM/SEC.

TABLE II

-----------SAMPLE-----------					-----STANDARD-----		
ID	P1	V1/V0	P2	V2/V0	UP(ST)	P(ST)	ST
1	43	0.953			0.790	36.4	PL
2	43	0.954			0.790	36.4	PL
3	46	0.951	56	0.900	0.790	36.4	PL
4	54	0.942	94	0.869	0.644	112	AL
5	56	0.942	126	0.842	0.818	147	AL
6	64	0.934	135	0.829	0.906	166	AL
7	71	0.928	189	0.785	1.176	227	AL
8	78	0.922	269	0.707	1.580	329	AL
9	43	0.953			0.644	112	AL
10	45	0.952	116	0.847	0.818	147	AL
11	62	0.935	184	0.788	1.176	227	AL
12	56	0.942	99	0.863	0.644	112	AL
13	58	0.940	132	0.837	0.818	147	AL
14	73	0.926	200	0.770	1.176	227	AL
15	94	0.908	277	0.690	1.580	329	AL
16			414	0.585	2.218	515	AL
17			450	0.571	2.218	515	AL
18			511	0.566	2.54	620	AL
19			558	0.504	2.66	660	AL
20			700	0.530	3.18	850	AL
21			721	0.540	3.18	850	AL
22	72	0.929	126	0.841	0.818	147	AL
23	75	0.925	126	0.843	0.818	147	AL
24	98	0.907	190	0.783	1.176	227	AL
25	108	0.899	263	0.705	1.580	329	AL

26	97	0.902	198	0.773	1.176	227	AL
27			511	0.566	2.54	620	AL
28			558	0.564	2.66	660	AL
29			725	0.546	3.18	850	AL
30			714	0.548	3.18	850	AL
31	52	0.958			0.680	29.8	PL
32	62	0.951			0.790	38.4	PL
33	115	0.917			0.644	112	AL
34	109	0.921	130	0.844	0.818	147	AL
35	135	0.908	196	0.783	1.176	227	AL
36	141	0.906			1.580	329	AL
37			703	0.558	3.18	850	AL
38			718	0.550	3.18	850	AL

COMMENTS:

1) SOURCE: WACKERLE, J.
JOURNAL OF APPLIED PHYS., VOL. 33, P. 922, (1962)
2) EXPERIMENTAL TECHNIQUES B AND E.
DATA REDUCTION TECHNIQUE D, FOR THE FIRST WAVE, ASSUMING 2UP = UFS,
FOR THE SECOND WAVE TECHNIQUE B WAS USED.
STANDARD MATERIALS ALUMINUM 2024 ALLOY AND PLEXIGLAS (PL IN TABLE).
3) THE ESTIMATED EXPERIMENTAL PRECISION IN UFS AND UP RANGES FROM 2-4 PERCENT.
ESTIMATED EXPERIMENTAL ERROR IN THE US1 MEASUREMENT IS 0.5 PERCENT AND FOR US2 IT IS 1.0 PERCENT.
4) UFS1 ATTENUATED EXPONENTIALLY IN TIME: UP1(MAX) IS HALF OF THE INITIAL JUMP OFF VELOCITY, UP1(MIN) IS HALF OF THE FINAL VELOCITY JUST BEFORE ARRIVAL OF THE 2ND. WAVE AT THE SURFACE. UP1(AV) IS THE TIME AVERAGE VALUE.
US1 IS THE VELOCITY OF THE ATTENUATING WAVE ON ARRIVAL AT THE FREE SURFACE AND HAS BEEN USED AS SUCH IN THE CALCULATION OF P1 AND P2.
UP1(MIN) IS USED IN CALCULATING P1 AND P2
5) V01 WAS CALCULATED USING THE LATTICE CONSTANTS A = 4.91267 AND C = 5.40459 ANGSTROMS, OBTAINED FROM A.C.A. MONOGRAPH NUMBER 5 (AMERICAN CRYSTALLOGRAPHIC ASSOCIATION, POLYCRYSTAL BOOK SERVICE 1983) 2ND. ED.
6) AN ESTIMATE WAS MADE OF THE HUGONIOT OF THE HIGH PRESSURE STISHOVITE PHASE OF QUARTZ. A HYPOTHETICAL STISHOVITE SAMPLE WITH A DENSITY OF 4.35 G/CC AT P = 0 HAS THE HUGONIOT EQUATION
US = 10 + 1.0*UP KM/SEC
MCQUEEN, R.G., FRITZ, J.N. AND MARSH, S.P.
JOURNAL OF GEOPHYSICAL RESEACRH, VOL. 68, P. 2319, (1963)
7) USING THE PIEZOELECTRIC RESPONSE OF X-CUT QUARTZ GRAHAM OBTAINED THE FOLLOWING STATISTICAL FIT OF THE SHOCK SPEED
US = A + B*UP WITH A = 5.728 +OR- 0.018 KM/SEC
AND B = 0.312 +OR- 0.112 FOR UP<1
R.A.GRAHAM, PHYS. REV., V. B6 (12), P. 4779, (1972)
8) LONGITUDINAL VELOCITIES PARALLEL AND PERPENDICULAR TO THE A AXIS ARE RESP 6.36 AND 5.78 KM/SEC AT 1 BAR AND 6.63 AND 6.21 AT 15 KBAR.
G.D. AFANAS'YEV AND YE.I. BAYUK ET ALL. DOKLADY, GEOPHYSICS
VOL. 201, P. 27, (1973)

TABLE I

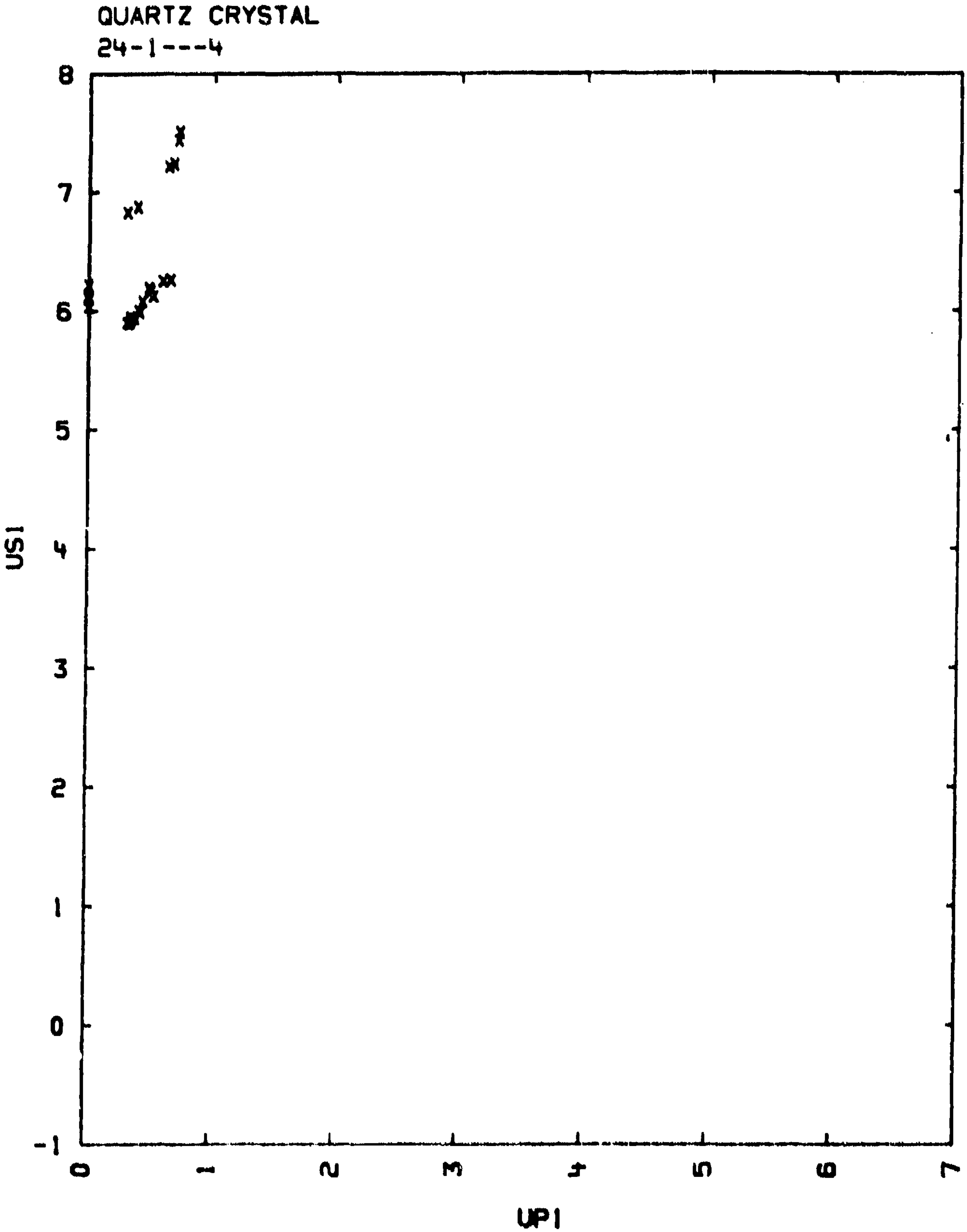
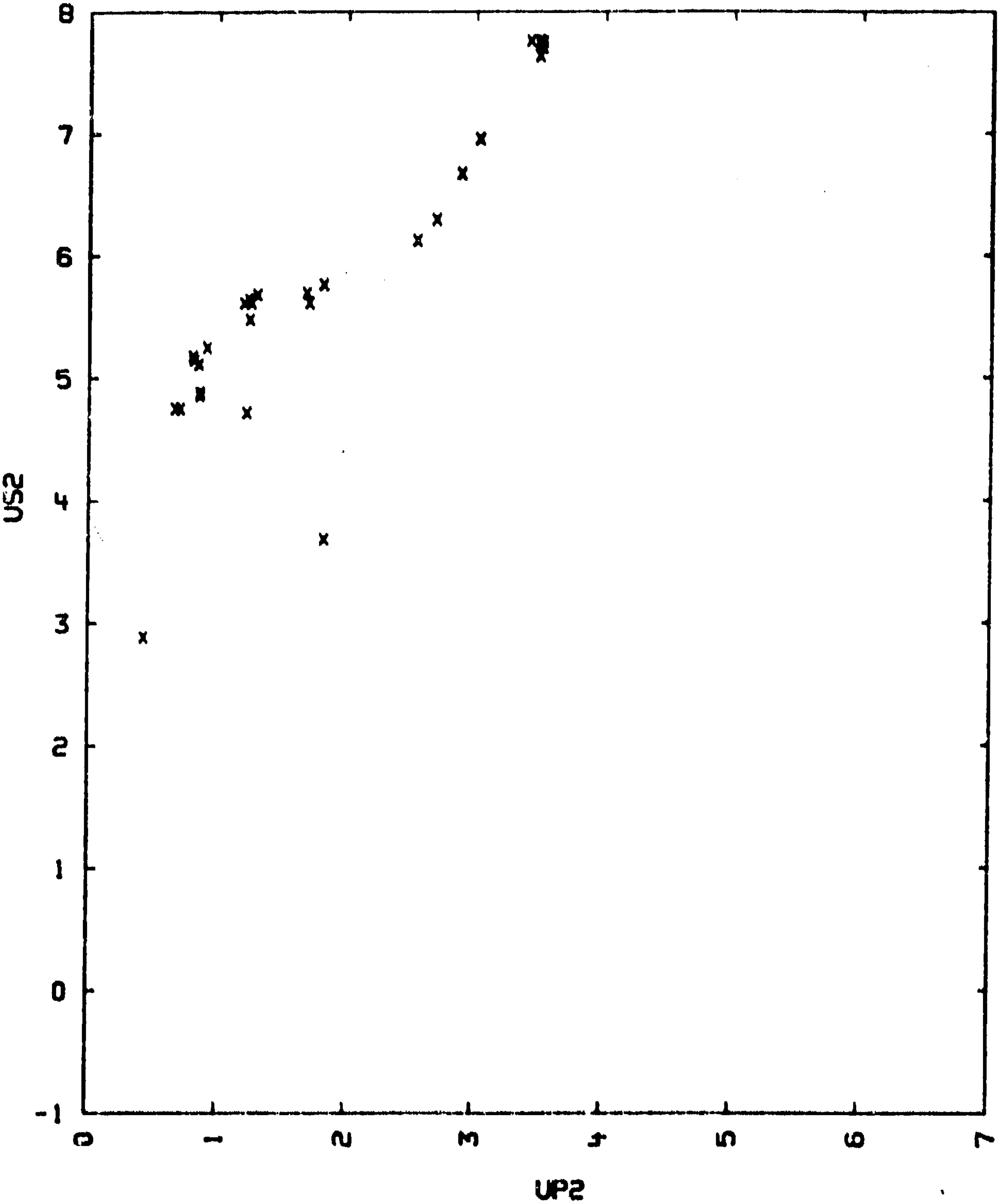


TABLE I

QUARTZ CRYSTAL
24-1---4



24-1---5
QUARTZ, FUSED

SI-02

VO = 0.4537 CC/G.   CL = 5.968 KM/SEC.   CO = 4.09 KM/SEC.
VOI = 0.3774 CC/G.   CS = 3.764 KM/SEC.

IN TABLE I BELOW, DENSITY IS GIVEN IN G/CC. AND VELOCITIES IN KM/SEC.
ID IS FOR IDENTIFICATION BETWEEN THE TABLES.
IN TABLE II, PRESSURES ARE GIVEN IN KILOBARS AND VELOCITY IN KM/SEC.,
ST DESIGNATES THE STANDARD MATERIAL.

TABLE I

ID	RHOO	US1	UP1	UFS1	US2	UP2	UFS2
0	2.204	5.890	0.000	0.000			
1	-	5.751	0.037	0.074			
2	-	5.624	0.076	0.152			
3	-	5.503	0.120	0.240			
4	-	5.387	0.174	0.348			
5	-	5.275	0.235	0.470			
6	-	5.168	0.306	0.612			
7	-	5.15	0.40	0.80			
8	-	5.17	0.49	0.98			
9	-	5.22	0.74	1.49			
10	-	5.25	0.81	1.63			
11	-	5.17	0.82	1.64			
12	-	5.20	0.83	1.67	4.52	1.04	1.74
13	-	5.23	0.84	1.68	4.67	1.40	1.98
14	-	5.20	0.85		4.70	1.41	
15	-	5.20	0.89	1.78	4.97	1.90	3.04
16	-	5.23	0.86	1.74	4.98	1.95	3.09
17	-				5.62	2.76	4.12
18	-				5.53	2.78	4.11
19	-				5.62	2.78	
20	-				6.43	3.25	
21	-				6.44	3.33	
22	-				7.28	3.81	6.39
23	-				7.30	3.87	

US1 = 5.78 - 2.14 UP KM/SEC. FOR UP FROM 0.0 TO 0.4 KM/SEC.
US1 = 5.07 + 0.183 UP KM/SEC. FOR UP FROM 0.4 TO 0.9 KM/SEC.
US2 = 4.03 + 0.477 UP KM/SEC. FOR UP FROM 1.0 TO 1.9 KM/SEC.
US2 = 1.30 + 1.58 UP KM/SEC. FOR UP FROM 2.5 TO 3.8 KM/SEC.

TABLE II

------------SAMPLE------------					-----STANDARD-----		
ID	P1	V/V01	P2	V/V02	UP(ST)	P(ST)	ST

0	0.00	1.000					
1	4.69	0.9836					
2	9.42	0.0865					
3	14.55	C.9782					
4	20.66	0.9677					
5	27.32	0.9555					
6	34.85	0.9408					
7	45.4	0.922			0.580	29.8	PL
8	55.8	0.905			0.780	36.4	PL
9	85.6	0.857			0.844	112	AL
10	94.3	0.845			0.818	147	AL
11	93.4	0.842			0.818	147	AL
12	95.7	0.839	117	0.791	0.906	166	AL
13	96.8	0.839	153	0.717	1.176	227	AL
14	98.0	0.836	157	0.718	1.176	227	AL
15	102.0	0.829	211	0.624	1.580	329	AL
16	99.1	0.836	217	0.614	1.580	329	AL
17			342	0.509	2.218	515	AL
18			337	0.501	2.218	515	AL
19			346	0.512	2.218	515	AL
20			460	0.495	2.66	660	AL
21			482	0.484	2.66	660	AL
22			611	0.477	3.18	850	AL
23			623	0.470	3.18	850	AL

COMMENTS:

1) SOURCE: WACKERLE, J.
JOURNAL OF APPLIED PHYS., VOL. 33, P. 922, (1962)
2) EXPERIMENTAL TECHNIQUE E FOR ID = 0-17 AND B FOR THE REST.
DATA REDUCTION TECHNIQUE D. USED FOR THE FIRST-WAVE, ASSUMING 2UP= UFS. FOR THE SECOND-WAVE TECHNIQUE B. WAS USED.
STANDARD MATERIALS ALUMINUM 2024 AND PLEXIGLASS (PL IN TABLE).
3) V01 WAS CALCULATED FROM THE LATTICE CONSTANTS A = 4.91267 AND C = 5.40459 ANGSTROMS; A.C.A. MONOGRAPH NUMBER 5 (AMERICAN CRYSTALLOGRAPHIC ASSOCIATION, POLYCRYSTAL BOOK SERVICE, BROOKLYN, N.Y., 1963) 2ND ED.
4) CL WAS VERIFIED EXPERIMENTALLY FOR THE SAMPLES USED. CL AND CS WERE OBTAINED FROM GARY, D. W., (AMERICAN INSTITUTE OF PHYSICS HANDBOOK, MCGRAW-HILL BOOK CO. INC., NEW YORK, 1957).
5) THE FIRST SHOCK VERSUS PARTICLE VELOCITY FIT IS NOT THAT OF A STEP FUNCTION BUT DEFINES A PRESSURE RAMP AHEAD OF ALL THE HIGHER PRESSURE WAVES. BETWEEN UP = 1.0 TO 1.9 KM/SEC THE MATERIAL IS IN THE TWO PHASE REGION AND ABOVE 1.9 KM/SEC IN THE STISHOVITE PHASE.
THE MOST COMPLETE SHOCK STRUCTURE REPRESENTED BY THE ABOVE DATA IS A RAMP FOLLOWED BY TWO PRESSURE STEPS.
6) THE FOLLOWING FUSED QUARTZ CURVE
P = 776.0*EPS - 4159*EPS**2 + 30340*EPS**3 - 69260*EPS**4
P = 131.7*UP - 73.61*UP**2 + 99.47*UP**3 - 41.63*UP**4
REPORTED BY BARKER,L.M. AND HOLLENBACH, J. APPL. PHYS 41 4208 70
FITS THE HUGONIOT UP TO 65 KBAR AND RELEASE CURVES FROM P = 37 KBAR AND BELOW.

TABLE I

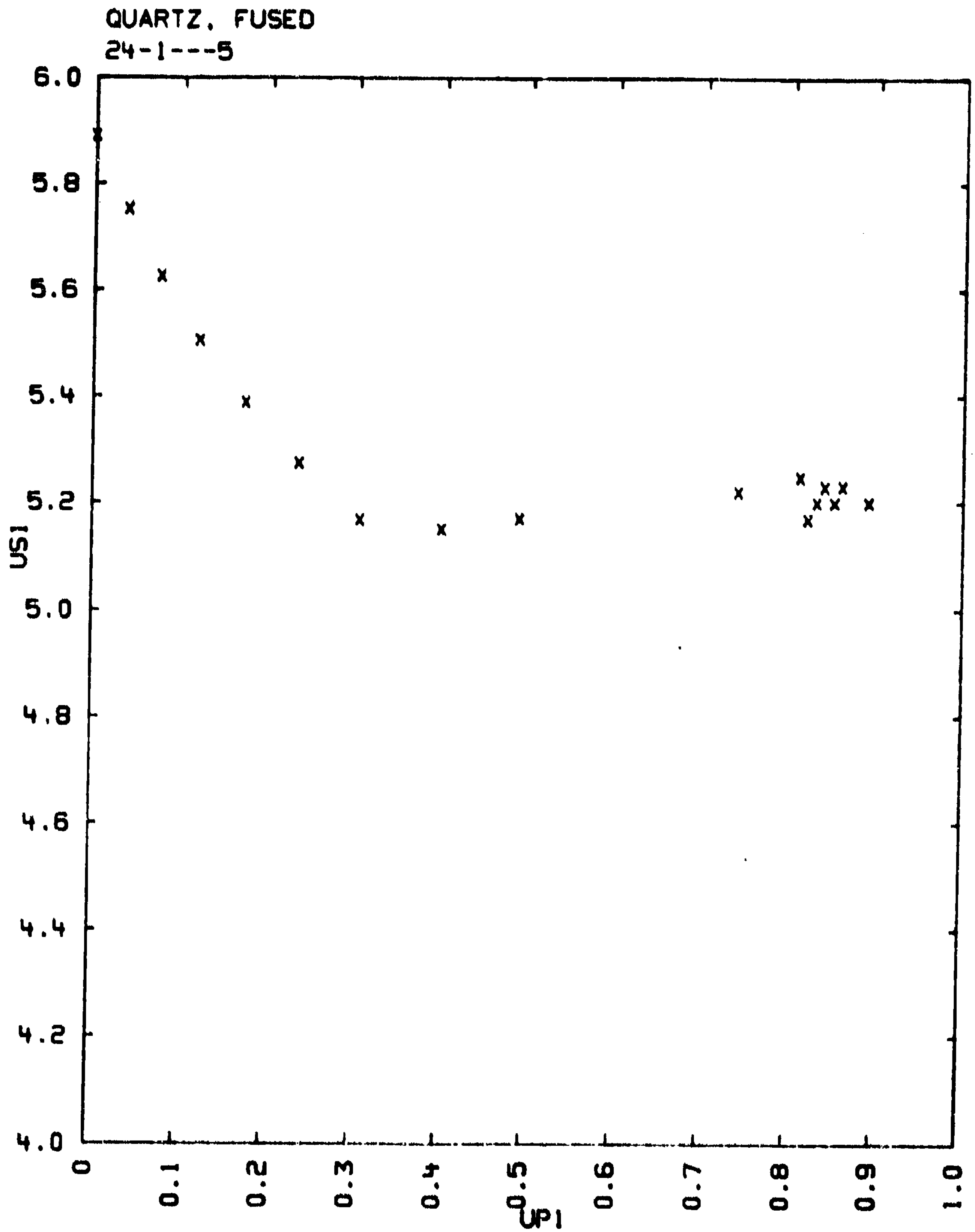

QUARTZ, FUSED
24-1---5
6.0
5.8
5.6
5.4
5.2
5.0
4.8
4.6
4.4
4.2
4.0
USI
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
UPI

TABLE 1

QUARTZ, FUSED
24-1---5

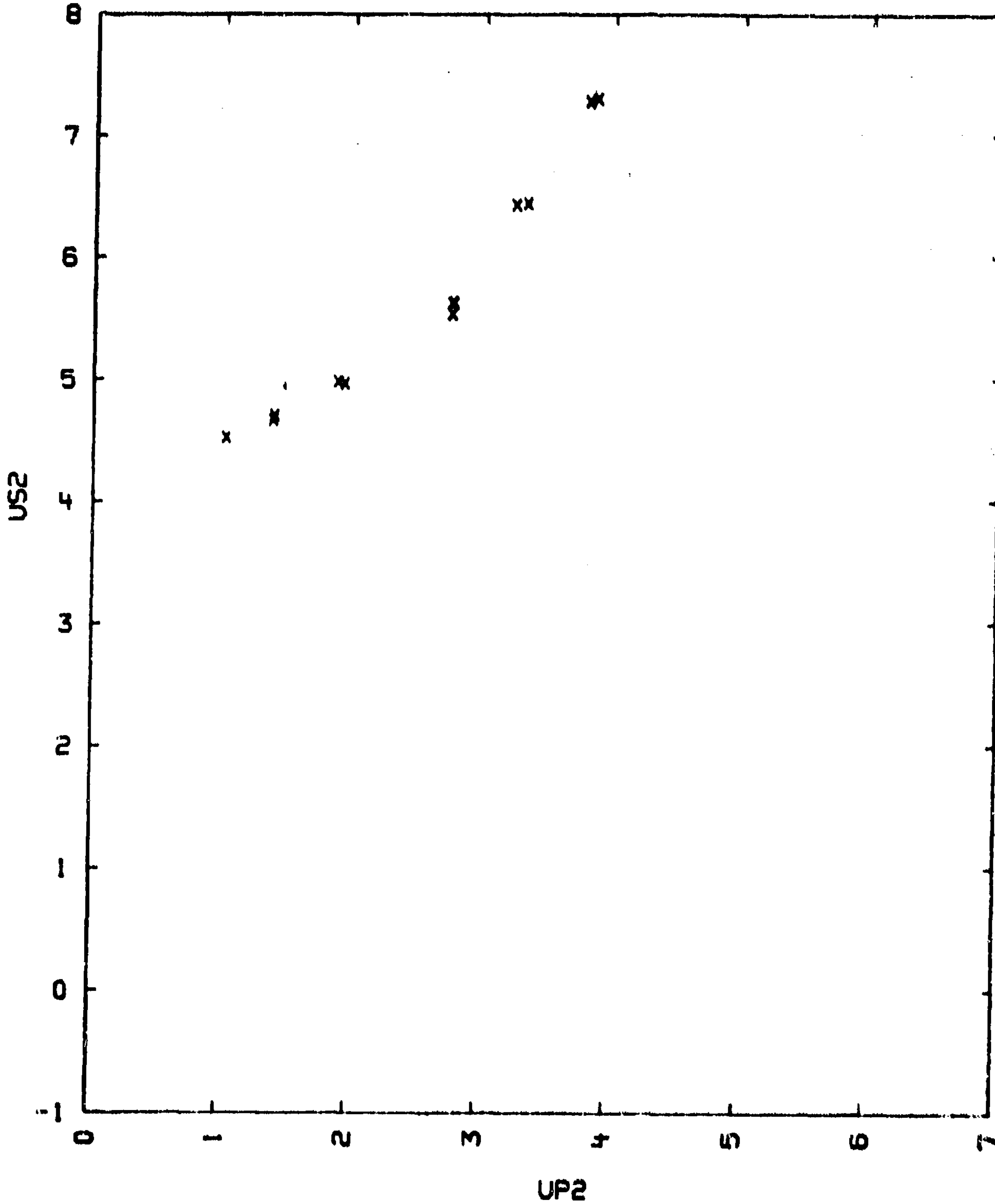
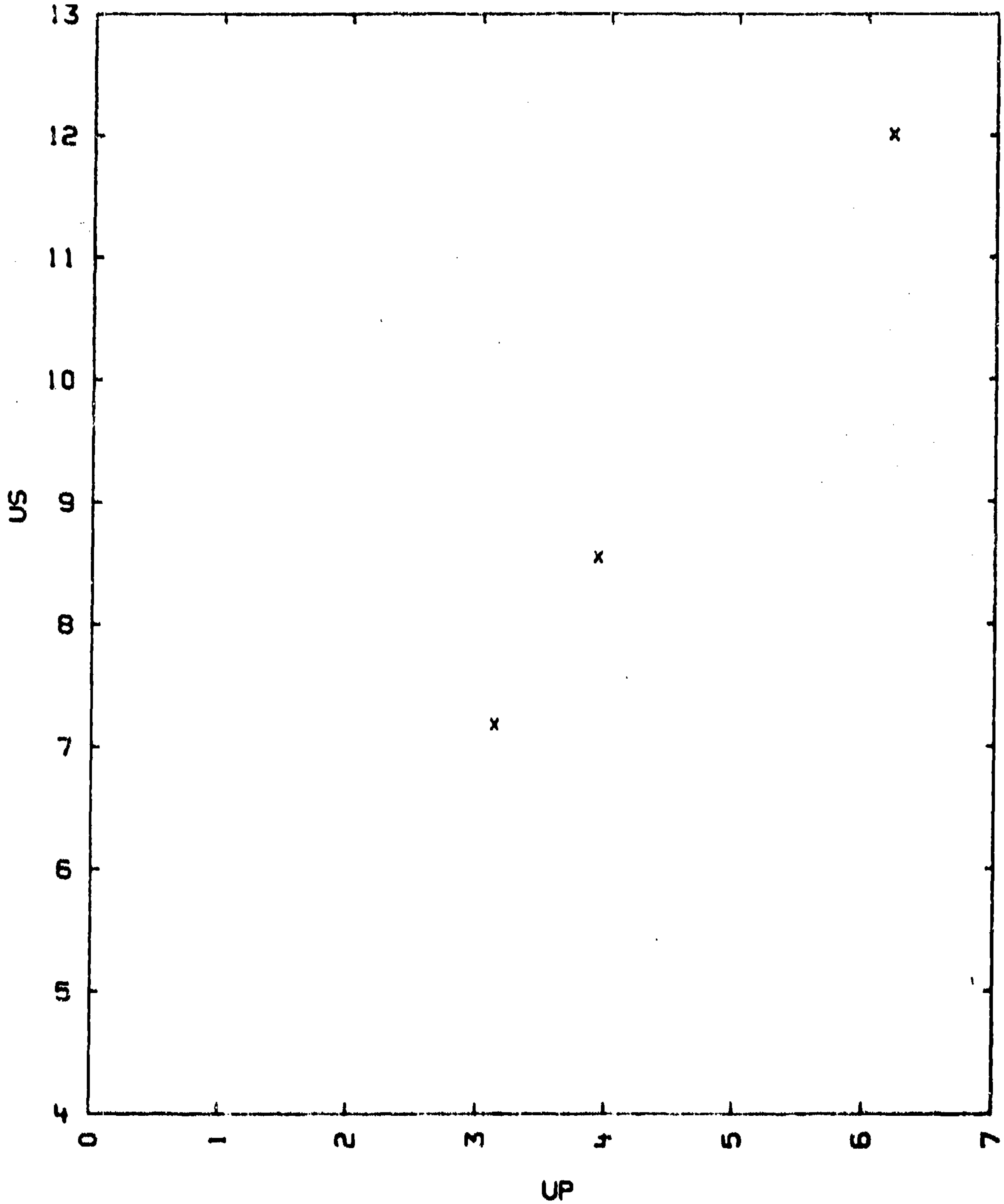


TABLE I

QUARTZ CRYSTAL (SILICONDIOXIDE)

24-1---6



24-1---6
QUARTZ CRYSTAL (SILICONDIOXIDE)

SI-02

V0 = 0.3774 CC/G
V01= 0.3774 CC/G

THE TABLE LISTS DENSITIES IN G/CC, VELOCITIES IN KM/SEC AND PRESSURE IN KBARS.

TABLE

RHO0	US	UP	P	V/V0
2.65	7.18	3.13	595	0.564
-	8.54	3.92	887	0.541
-	12.01	6.2	1974	0.484

US = 2.35 + 1.56 UP KM/SEC
SIGMA US = 0.092 KM/SEC

COMMENTS:

1) SOURCE: AL'TSHULER, L. V., TRUNIN, R. F., SIMAKOV, G. V.
IZV. AKADEMII NAUK SSSR, FIZIKA ZEMLI NO. 10, 1965, P. 1-6
2) EXPERIMENTAL TECHNIQUE: NOT REPORTED
DATA REDUCTION METHOD: NOT REPORTED
3) V01 WAS OBTAINED FROM THE HEXAGONAL LATTICE PARAMETERS A = 4.91265 AND C = 5.40441 ANGSTROM.: CRYSTAL DATA DETERMINATIVE TABLES, MONO-GRAPH 5 (AMERICAN CRYST. ASSN., JOHN WILEY AND SONS, 1963) 2ND ED.
4) TWO ISOTHERMS FOR THE HIGH DENSITY FORM OF QUARTZ (STISHOVITE) AT 0 AND 4000 DEG. K WERE CALCULATED WITH A GRUNEISEN GAMMA = 0.9 AND THE MCQUEEN METHOD OF CALCULATING THE STISHOVITE HUGONIOT:
MCQUEEN FRITZ AND MARSH, J. GEOPHYS. RES., VOL. 68, P. 2319 (1963)

P	RHO(HUG)	RHO(0 DEG. K)	RHO(4000 DEG. K)
0	4.35	4.35	4.28
20	4.535	4.536	4.48
40	4.708	4.710	4.65
60	4.87	4.872	4.81
80	5.03	5.033	4.975
100	5.18	5.19	5.13
120	5.33	5.34	5.278
140	5.47	5.483	5.42
160	5.61	5.63	5.565
180	5.74	5.77	5.705
200	5.87	5.91	5.846
220	6.00	6.053	5.987
240	6.12	6.18	6.123
260	6.235	6.33	6.268

NO PHYSICAL SIGNIFICANCE IS ATTACHED TO THE DISCONTINUITY AT
UP = 1.54 KM/SEC.

5) V0I HAS CALCULATED WITH THE HEXAGONAL UNIT CELL CONSTANTS
A=4.91267 AND C=5.40459 ANGSTROMS; A.C.A. MONOGRAPH NO 5 (AMERICAN
CRYST. ASSN., POLYCRYSTAL BOOKSERVICE. N.Y., 1963) 2ND ED.

24-1---7
QUARTZ (SAND)

SI-02 97 PERCENT BY WEIGHT
POROSITY 40 PERCENT
GRAIN SIZE LESS THAN 1MM.

V0 = 0.625 CC/G.
V01 = 0.3774 CC/G.

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC., VELOCITIES IN KM/SEC., AND PRESSURE IN KILOBARS.

TABLE

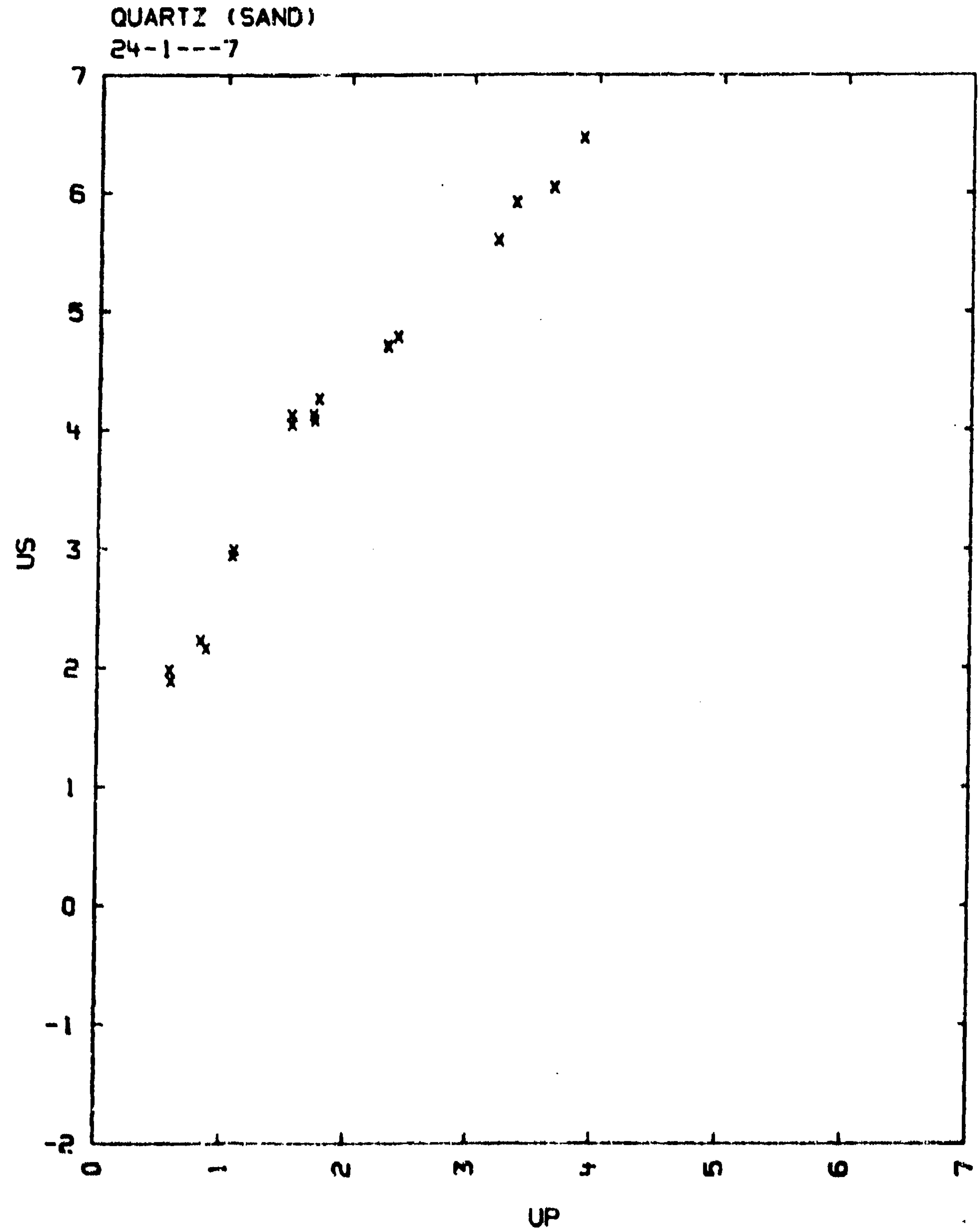
RHO0	US	UP	P	V/V0
1.60	1.68	0.58	17	0.692
-	1.97	0.57	18	0.711
-	2.22	0.82	29	0.630
-	2.15	0.86	30	0.600
-	2.94	1.07	50	0.636
-	2.98	1.08	51	0.638
-	4.04	1.54	100	0.619
-	4.12	1.54	102	0.626
-	4.07	1.72	112	0.577
-	4.12	1.71	113	0.585
-	4.26	1.76	120	0.586
-	4.70	2.31	175	0.508
-	4.78	2.40	184	0.498
-	5.60	3.21	288	0.427
-	5.91	3.34	316	0.435
-	6.04	3.65	353	0.396
-	6.46	3.88	401	0.399

US = 0.441 + 2.33 UP KM/SEC. SIGMA US = 0.16 KM/SEC.
FOR UP RANGING FROM 0.57 TO 1.54 KM/SEC.
US = 2.32 + 1.04*UP KM/SEC. SIGMA US = 0.08 KM/SEC
FOR UP RANGING FROM 1.72 TO 3.88 KM/SEC.

COMMENTS:

1. SOURCE: HART AND SKIDMORE I. C.
PRIVATE COMMUNICATION (1965)
SKIDMORE I. C.
APPLIED MATERIALS RESEARCH, VOL. 4, P. 131, (1965)
2) EXPERIMENTAL TECHNIQUE A.
DATA REDUCTION TECHNIQUE B.
ALUMINUM, IRON, AND BRASS WERE USED AS STANDARDS.
3) X-RAY DIFFRACTION SHOWED A CLEAR CUT PATTERN OF ALPHA QUARTZ WITH NO OTHER PHASE PRESENT. THE TECHNIQUE IS NOT SENSITIVE TO IMPURITY PHASES OF LESS THAN 5 PERCENT.
4) ANOTHER FIT OF THE LOW PRESSURE DATA USING OTHER THEORETICAL CONSIDERATIONS IS: UP = (0.327*US)/(1 - 0.0102*US**2) KM/SEC.

TABLE 1



24-1---8
QUARTZITE

COMPOSITIONS FROM THREE DIFFERENT LOCATIONS

A ARKANSAS NOVACULITE (AN):	SI-O2 AS QUARTZ	ABOUT	100 PERCENT BY VOL.
	PARTICLE SIZE	-	0.01 MM.
B SIOUX QUARTZITE (SQ):	SI-O2 AS QUARTZ	-	99 PERCENT BY VOL.
	PARTICLE SIZE		0.1 MM
	HEMATITE DUST	REMAINDER	
	SI-O2 CEMENT	-	
C EUREKA QUARTZITE (EQ):	SI-O2 AS QUARTZ	ABOUT	99 PERCENT BY VOL
	SI-O2 CEMENT	TRACE	

V0 = 0.3774-0.3788 CC/G
V01= 0.3774 CC/G

TABLE I LISTS THE SHOCK AND PARTICLE VELOCITIES OF AN ELASTIC AND PLASTIC WAVE IN KM/SEC. SM - SAMPLE MATERIAL: DEFINED ABOVE. STM IS THE STANDARD MATERIAL. TABLE II LISTS THE CORRESPONDING PRESSURES IN KBARS, COMPRESSIONS AND THE SOURCE EXPERIMENT NUMBERS(SNO).

TABLE I

	- - - - SAMPLE	- - - -	- - - -	- - - -	- - - -	STANDARD	
NO	SM	US1	UP1	US2	UP2	STM	UFS
1	AN	5.88	0.53	3.12	0.66	AL	1.188
2	-	6.40	0.571	3.87	0.94	AL	
3	-	6.235	0.479				
4	-	6.225	0.449				
5	-	6.190	0.386				
6	-	6.129	0.135				
7	-	5.992	0.204				
8	-	6.112	0.336				
9	-	6.104	0.306				
10	-	6.098	0.282				
11	-	6.091	0.256				
12	-	6.080	0.234				
13	SQ			6.20	1.415	AL	
14	-	5.626	0.249	4.881	0.615		
15	-	5.561	0.206	4.829	0.787		
16	-	5.541	0.168	4.759	0.703		
17	-	5.499	0.106	4.620	0.508		
18	-	5.477	0.066	4.546	0.342		
19	EQ	5.616	0.253	4.856	0.313		
20	-	5.648	0.319				
21	-	5.671	0.222				
22	-	5.696	0.174				

US =

TABLE II

NO	SM	RHOO	P1	V1/V0	P2	V2/V0	SNO
1	AN	2.65	82	0.91[illegible]	92	0.864	8238
2	-	2.65	96.8	0.9108	132	0.809	8270
3	-	2.642	78.9	0.9232			8300
4	-	-	73.8	0.9292			-
5	-	-	63.1	0.9377			-
6	-	-	21.8	0.9780			-
7	-	2.649	32.4	0.9660			8275
8	-	2.642	54.2	0.9450			8299
9	-	-	49.4	0.9499			-
10	-	-	45.4	0.9538			-
11	-	-	41.2	0.9580			-
12	-	-	37.0	0.9625			-
13	SO	2.64			232	0.772	7695
14	-	2.640	37.0	0.9558	83.8	0.8802	7468
15	-	-	30.2	0.9630	103.8	0.8419	-
16	-	-	24.6	0.9697	91.5	0.8567	-
17	-	-	15.4	0.9817	64.2	0.8943	-
18	-	-	9.5	0.9880	42.5	0.9271	-
19	EO	-	37.5	0.9550			7998
20	-	-	47.6	0.9435			-
21	-	-	33.2	0.9609			-
22	-	-	26.1	0.9695			-

COMMENTS:

1) SOURCE: AHRENS T. J. AND GREGSON JR. V. G.
J. GEOPHYS. RES., VOL. 69, P. 4839 (1964)

2) EXPERIMENTAL TECHNIQUE: C AND D
IN MOST EXPERIMENTS THE INCIDENT WAVE REACHED THE SURFACE AT AN ANGLE AND VARIED IN PRESSURE ALONG THE FRONT, ALLOWING SEVERAL PRESSURE MEASUREMENTS IN A SINGLE EXPERIMENT.
DATA REDUCTION METHOD: B AND D WITH 2UP=UFS.

3) V0I HAS HAS CALCULATED USING THE HEXAGONAL LATTICE CONSTANTS- A=4.91267 AND B=5.40459 ANGSTROM: CRYSTAL DATA DETERMINATIVE TABLES MONOGRAPH 5 (AMERICAN CRYSTALLOGRAPHIC ASSOCIATION, POLYCRYSTAL BOOK SERVICE, BROOKLYN, N.Y., 1963) 2ND ED.

4) ENTRIES 3 TO 7 WERE OBTAINED FROM A SINGLE WEDGE OF QUARTZ AS WERE ENTRIES 8 TO 13, 14 TO 19 AND 19 THROUGH 22.
THE ELASTIC PRECURSOR WAVE 1 SHOWS A YIELD POINT WHICH IS A FUNCTION OF ITS SEPERATION FROM WAVE 2. IN ENTRY NO 14 - 19 UP1 DECREASES AS THE WAVE SEPARATION INCREASES IN THE 2 DIMENSIONAL WEDGE METHOD USED.
P2 AND V2/V0 WERE COMPUTED TAKING THE LISTED NUMBERS AS THOSE OF SIMPLE SQUARE PRESSURE STEPS

TABLE I

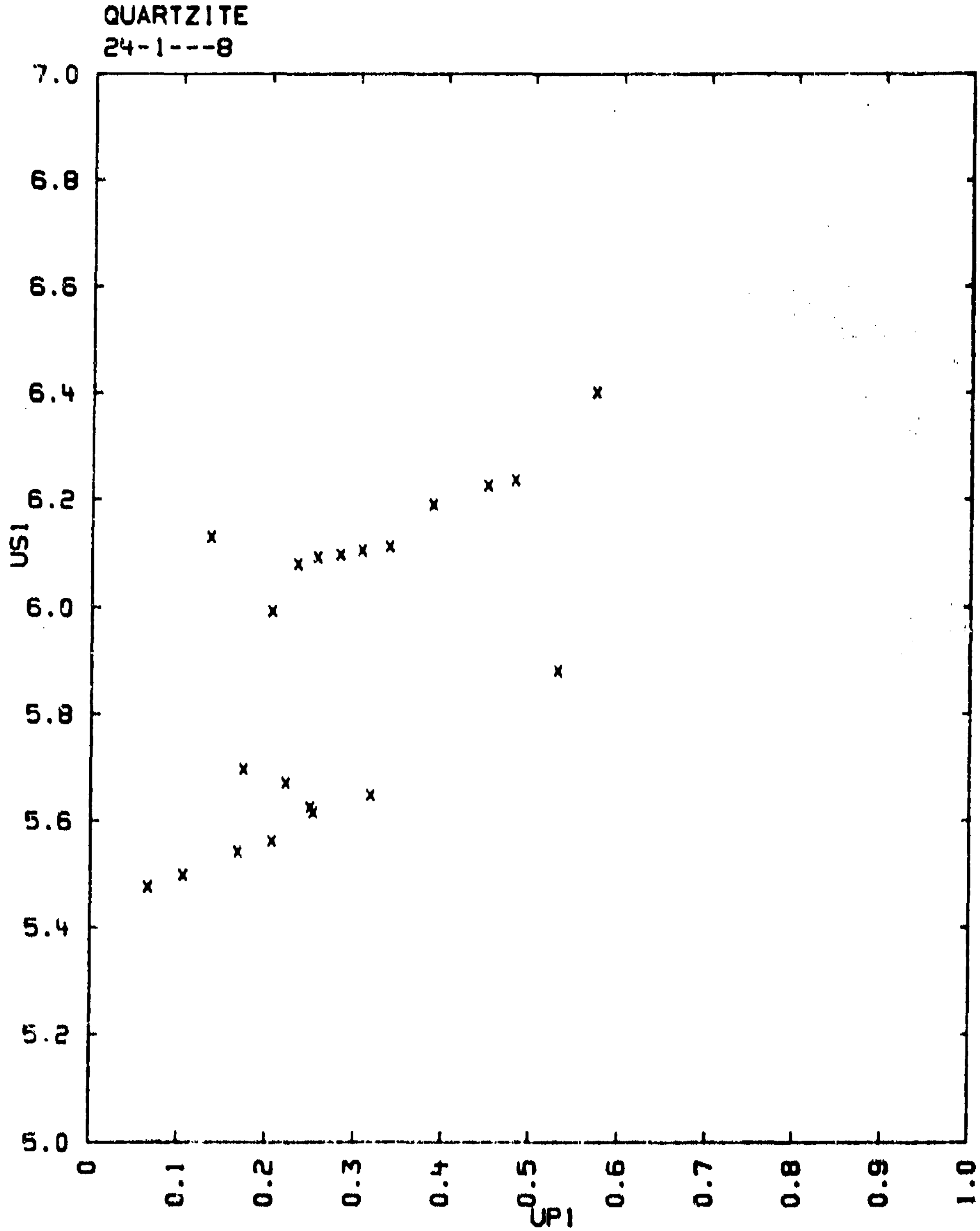
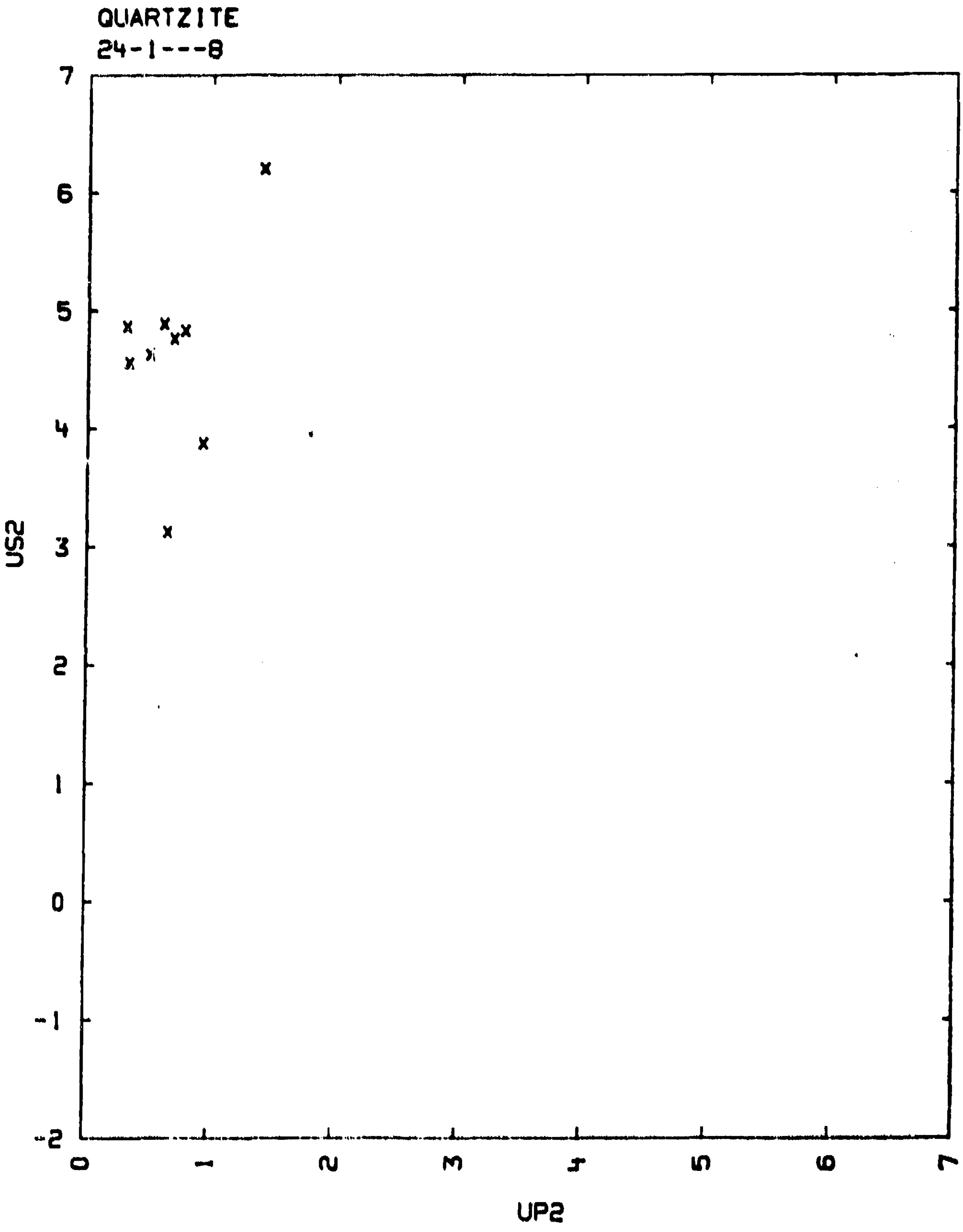

QUARTZITE
24-1---8
USI
UPI
7.0
6.8
6.6
6.4
6.2
6.0
5.8
5.6
5.4
5.2
5.0
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0

TABLE 1



24-1---9
QUARTZITE

ARKANSAS NOVACULITE (AN):	QUARTZ		
	PARTICLE SIZE	ABOUT 100 PERCENT BY VOL.	
SIOUX QUARTZITE (SQ):	QUARTZ	-	0.01 MM
	PARTICLE SIZE	-	99 PERCENT BY VOL.
	HEMATITE DUST	REMAINDER	
	SI-O2 CEMENT	-	
EUREKA QUARTZITE (EQ):	QUARZ	ABOUT 99	- - -
	SI-O2 CEMENT	TRACE	

V0 = 0.3774-0.3780 CC/G
V0I= 0.3774 CC/G

TABLE I GIVES SHOCK VELOCITY AND PARTICLE VELOCITY OF THE ELASTIC AND PLASTIC WAVE IN KM/SEC AS WELL AS FREE SURFACE VELOCITY. D = SAMPLE THICKNESS IN MM. SM = SAMPLE MATERIAL.
TABLE II GIVES CORRESPONDING PRESSURE AND COMPRESSION. VF IS A CALCULATED VOLUME AFTER DECOMPRESSION. INITIAL DENSITY IN G/CC.

TABLE IA

- - -	- - -	- - -	- - -	SAMPLE	- - -	- - -	- - -	STANDARD
NO	SM	US1	UP1	US2	UP2	UFS2	D	UFS
1	AN	6.35	0.645	5.16	1.13	1.96	3.28	2.03
2	-	6.26	0.673	4.55	1.16	1.96	3.28	-
3	-	6.18	0.652	4.86	1.14		6.56	-
4	-	6.04	0.598	4.84	1.16	1.98	6.51	-
5	-	6.28	0.438	5.12	1.15	1.92	13.19	-
6	-	6.24	0.522	5.04	1.14		13.19	-
7	-	6.14	0.406	5.45	0.97		12.74	1.76
8	-	6.14	0.496	4.85	0.98	1.79	12.74	-
9	-	5.97	0.832	4.37	0.985	1.90	2.95	1.79
10	-	5.94	0.665	3.72	1.025	2.03	3.45	1.78
11	-	6.15	0.441	5.09	1.00	1.50	13.41	1.80
12	-	6.14	0.444	5.04	1.01	1.56	13.36	1.81
13	-	6.12	0.50	4.96		1.71	12.97	
14	EQ	6.06	0.484	5.41	1.075	1.81	3.34	1.93
15	-	5.83	0.471	4.97	1.10	1.83	6.61	-
16	-	5.92	0.540	4.72	1.10	1.91	6.65	-
17	-	5.98	0.431	5.19	1.085	1.79	12.94	-
18	-	5.94	0.460	4.96	1.095	1.69	12.94	-
19	SQ	6.31	0.409	5.53	1.03	1.84	3.34	1.88
20	-	5.96	0.290	5.39	1.05		6.61	-
21	-	5.95	0.305	5.20	1.06		11.44	-
22	AN	6.313	0.85	5.77	1.76	3.29	9.56	3.20
23	-	6.144	0.38	5.694	1.95	2.91	8.89	3.43
24	-	6.170	0.64	5.942	2.00	3.38	6.35	3.49

QUARTZITE

NO	SM	US1	UP1	US2	UP2	UFS2	D	UFS
25	-	6.378		5.596	1.98	3.78	6.38	-
26	-	6.302	0.671	5.982	1.74	2.97	6.38	
27	-	-	-	5.238	1.98	3.41	6.38	
28	-	6.36	0.68	5.62	2.02		6.36	
29	-	6.22	0.67	5.86	2.37	4.26	6.14	
30	-	6.155	0.41	5.81	2.41	3.45	6.80	
31	-	6.18	0.83	5.91	2.40	4.17	4.56	
32	-	6.17	0.453	4.68	0.77	1.23	11.07	1.41
33	-	6.06	0.432	4.62	0.875	1.24	13.42	1.56
34	-	6.04	0.422	4.80	0.865	1.19	13.42	1.55
35	-	6.12	0.415	4.88	0.87	1.16	13.42	1.57
36	-	5.94	0.665	3.72	1.025	2.03	3.45	1.78
37	-	6.18	0.469	5.03	0.98	1.65	11.07	1.78
38	-	6.14	0.406	5.45	0.97		12.74	1.76
39	-	6.14	0.496	4.85	0.98	1.79	12.74	
40	-	6.15	0.441	5.09	1.00	1.50	13.41	1.80
41	-	6.14	0.444	5.04	1.01	1.56	13.36	1.81
42	-	5.97	0.832	4.37	0.985	1.98	2.95	1.79
43	-	6.12	0.50	4.96	(1.08)	1.71	12.97	(1.92)
44	-	6.206	(0.25)	5.530	(1.95)	(3.08)	6.38	3.49
45	-	6.302	0.671	5.238	1.98	3.41	6.38	3.49
46	-	6.36	0.68	5.62	2.02		6.36	3.58
47	-	6.22	0.67	5.86	2.37	4.265	6.14	3.28
48	-	6.15	(0.41)	5.81	2.41	3.45	6.80	4.19
49	-	6.18	0.83	5.91	2.40	4.17	4.56	3.33

US =

TABLE 1B

NO	SM	US	UP	UFS	D	UFS
50	AN	6.234	2.41	3.61	6.82	4.31
51	-	6.15	2.50	4.26	6.50	4.42
52	-	6.27	2.47	4.07	6.35	4.43
53	-	6.25	2.50	4.06	6.82	4.61
54	-	6.28	2.70	4.53		4.78

US =

TABLE 11A

NO	SM	RHOO	P1	V1/V0	P2	V2/V0	VF/V0
1	AN	2.628	107.6	0.8994	170	0.8018	
2	-	-	110.7	0.8025	164	0.7804	
3	-	-	105.0	0.8045	167	0.7907	
4	-	-	94.9	0.9010	154	0.7816	

5	-	-	72.3	0.9303	165	0.7888	
6	-	-	85.6	0.9163	165	0.7910	
7	-	-	65.5	0.9339	144	0.8295	
8	-	-	80.0	0.9192	140	0.8170	
9	-	-	130.5	0.8606	147	0.8234	
10	-	-	103.8	0.8880	136	0.7834	
11	-	-	71.3	0.9283	145	0.8167	
12	-	-	71.6	0.9277	145	0.8134	
13	-	-	80.4	0.918			
14	EQ	2.629	77.1	0.9214	159	0.8108	
15	-	-	72.2	0.9192	153	0.7907	
16	-	-	84.0	0.9088	152	0.7870	
17	-	-	67.8	0.9279	156	0.8004	
18	-	-	71.8	0.9225	153	0.7923	
19	SQ	2.626	67.8	0.9352	157	0.8218	
20	-	-	45.4	0.9513	153	0.8095	
21	-	-	47.7	0.9487	150	0.8024	
22	AN	2.65	142.0	0.865	279	0.705	0.882
23	-	2.628	61	0.938	295	0.661	0.733
24	-	-	103	0.896	297	0.648	0.817
25	-	-	-	-	298	0.654	
26	-	-	111	0.894	278	0.714	0.854
27	-	-	-	-	287	0.637	0.846
28	-	-	114	0.893	311	0.651	
29	-	-	110	0.892	369	0.600	
30	-	-	67	0.933	371	0.588	0.662
31	-	-	137	0.866	382	0.598	
32	AN	2.628	74.	0.927	111.	0.857	
33	-	-	68.7	0.929	120.5	0.830	
34	-	-	67.0	0.930	122.	0.836	
35	-	-	66.7	0.932	123.5	0.837	
36	-	-	103.8	0.888	138.	0.783	
37	-	-	76.2	0.924	142.	0.820	
38	-	-	65.5	0.934	144.	0.829	
39	-	-	80.0	0.919	140.	0.817	
40	-	-	71.3	0.928	144.5	0.817	
41	-	-	71.6	0.928	145.5	0.813	
42	-	-	130.5	0.861	147.	0.823	
43	-	-	80.4	0.918	154.	0.793	
44	-	-			306.	0.668	0.778
45	-	-	111.	0.894	287.	0.637	0.846
46	-	-	114.	0.893	308.	0.651	
47	-	-	110.	0.892	369.	0.600	
48	-	-	67.	0.933	371.	0.588	0.662
49	-	-	135.	0.866	377.	0.598	

TABLE 11B

NO	SM	RHOO	P	V/V0	VF/V0
50	AN	2.628	395	0.613	0.704
51	-	-	404	0.594	0.796

52	-	-	407	0.606	0.773
53	-	-	426	0.586	0.717
54	-	-	445	0.570	0.767

TABLE III LISTS RELEASE STATES BETWEEN P=0 AND P2 OBTAINED BY RELEASE OF THE ABOVE SHOCKS INTO BUFFERS OF MAGNESIUM (MG), GLYCEROL (GL), WATER (W), ETHANOL (ET), ETHYLETHER (ETE), OR BY ACCELERATING A BRASS SHIM (BS) P1R/U IS A RELEASE STATE FROM THE ELASTIC PRECURSOR AND P2R FROM THE FINAL SHOCK STATE P2. P IS IN KBAR AND U IN KM/SEC.

TABLE III

ENTRY	32	33	33	34	34	35
P1/U	51.5/.558	24.3/.581	13.4/.627	23.9/.570	15.7/.555	22.8/.748
P2/U	79.5/.817	54.5/1.02	41.2/1.12		36.5/.994	38.1/1.01
BUFFER	MG	GL	ET	GL	[illegible]	W

ENTRY	35	39	39	40	40	41
P1/U	13.5/.657	46.0/.505	52.3/.568	24.8/.575	21.7/.693	[illegible].3/.637
P2/U	34.2/1.20	96.0/.958	96.0/.96	71.0/1.19	58.4/1.25	58.[illegible]/1.07
BUFFER	ET	MG	MG	GL	W	[illegible]

ENTRY	41	41	43	43	46	46
P1/U	23.1/.758	15.0/.675	28.2/.651	17.6/.755		
P2/U		48.1/1.29	75.3/1.26		184./2.36	109./2.71
BUFFER	W	ET	GL	ET	GL	ETE

ENTRY	47	47	49	49	49
P2/U	41.0/3.22	31.0/3.44	332./2.51	275./3.13	134./3.04
	BS	BS	MG	GL	ETE

COMMENTS

1) SOURCE: AHRENS, T. J. AND DUVALL, G. E.
J. GEOPHYS. RES., VOL. 71, P. 4349 (1966) (ENTRY 1-22)
AHRENS, T. J. AND ROSENBERG, J. T.
CONFERENCE ON SHOCK METAMORPHISM (1966)
POULTER LABORATORY, PALO ALTO, CALIF. USA (ENTRY 22-31,50-54)
AHRENS T.J., ROSENBERG J.T., RUDERMAN M.H.
DYNAMIC PROPERTIES OF ROCKS
PROJECT FGU-4816. REPORT DASA 1868 (SEPT. 30 1966)
STANFORD RESEARCH INSTITUTE
MENLO PARK, CALIF., USA (ENTRY 32-49)

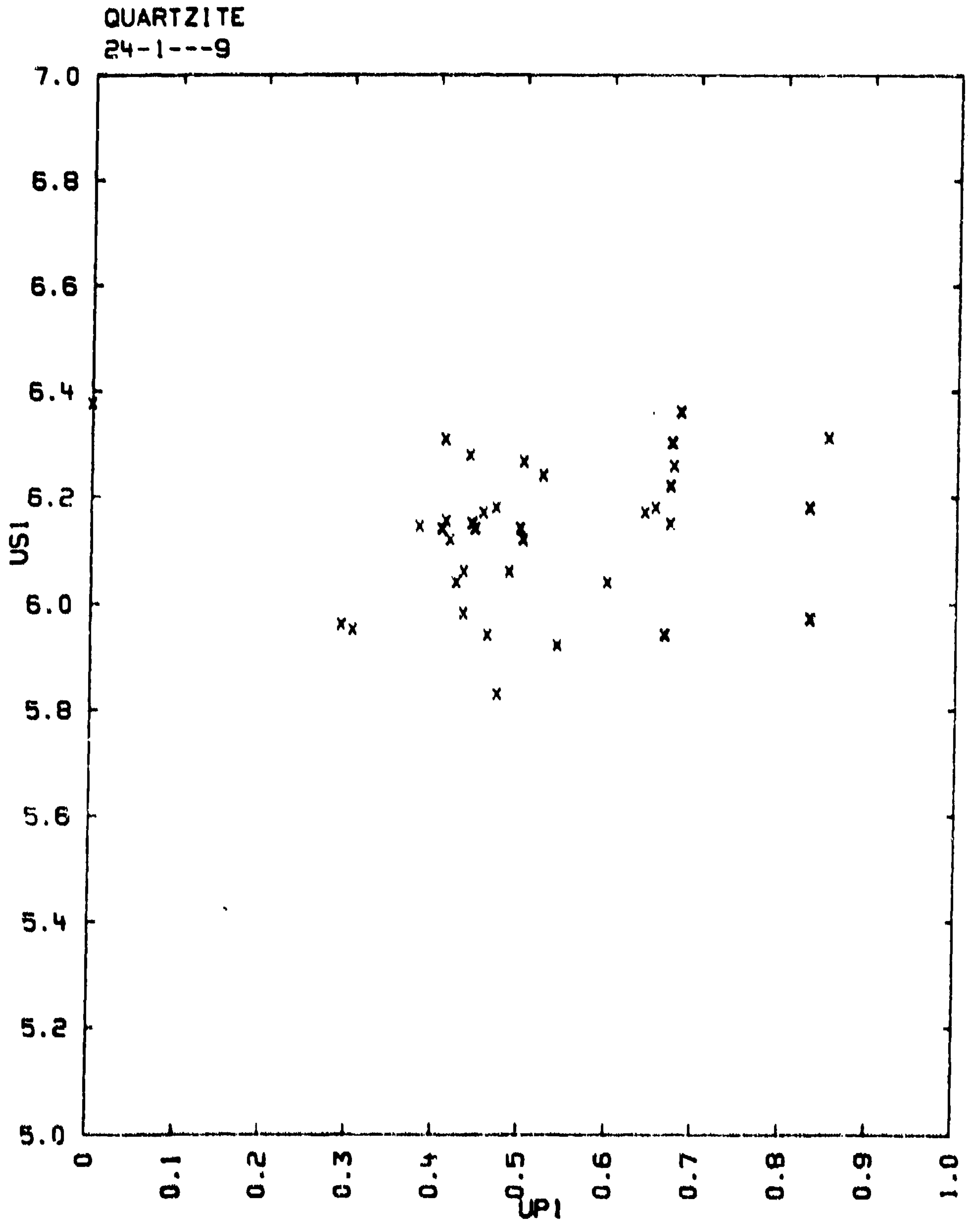
2) EXPERIMENTAL TECHNIQUE C2
DATA REDUCTION METHOD B STANDARD MATERIALS 2024 ALUMINUM
356 BRASS
D WITH UP1 = 1/2*UFS1.

3) V01 WAS CALCULATED FROM THE HEXAGONAL LATTICE CONSTANTS A=4.91267 AND B=5.40459 ANGSTROM: CRYSTAL DATA DETERMINATIVE TABLES, MONOGRAPH 5 (AMERICAN CRYSTALLOGRAPHIC ASSOCIATION, POLYCRYSTAL BOOK SERVICE, BROOKLYN, N.Y., 1963) 2ND ED.

4) THE ATTENUATION OF THE ELASTIC WAVE WAS DETERMINED TO BE ABOUT 3 KB PER MM.

5) CALCULATED FINAL VOLUMES INDICATE THAT THE SHOCK TRANSFORMED MATERIAL REMAINS IN THE HIGH DENSITY PHASE.
6) VF IS CALCULATED ON THE ASSUMPTION THAT THE ISENTROPIC RELEASE PATH IN THE P,V PLANE IS LINEAR
7) ENTRIES 22 23 44 AND 48 HAVE UNCERTAIN UP1 VALUES. UP1 VALUES OF ENTRY 46 47 AND 49 WERE ESTIMATED. UP2 OF ENTRY 44 IS ALSO UNCERTAIN. AND UP1 VALUE FOR THE CALCULATION OF P2 AND V2/V0 ESTIMATED.
8) THE DATA IN THE 260 - 300 KBAR RANGE INDICATED AN INCREASE OF COM-PRESSIBILITY AND THE POSSIBILITY OF A TWO WAVE STRUCTURE.
9) THE SLOPE DP/DV ALONG THE RELEASE PATH IMPLIES A FROZEN COMPOSITION EXCEPT THAT A) ENTRY 47 AND 49 SHOW RECONVERSION FROM STISHOVITE TO ALPHA QUARTZ BELOW 40 KBAR, AND B) RECOVERED SAMPLES CONSIST MAINLY OF POWDERED ALPHA QUARTZ.
10)MANGANIN AND PARTICLE VELOCITY GUAGE EXPERIMENTS CONFIRM THE ABOVE BEHAVIOR AND INDICATE THAT MURNAGHAN FORMS FOR ALPHA QUARTZ AND STISHOVITE CAN BE USED TO REPRESENT THE RELEASE PATHS OF THE MIXED PHASES. THE SAMPLES USED WERE ARKANSAS NOVACULITE (RHO0=2.63 G/CC CL=0.59 KM/SEC) AND NUGGET SANDSTONE (RHO0=2.53 G/CC CL=0.38 KM/SEC) (W.J. MURRY AND D.E. GRADY. EQUATION OF STATE OF ROCKS. (LAWRENCE LIVERMORE LABORATORY , LIVERMORE CALIF. 94550, REPORT NO. UCRL-13580 1973)

TABLE IA



QUARTZITE
24-1---9
USI
UPI
7.0
6.8
6.6
6.4
6.2
6.0
5.8
5.6
5.4
5.2
5.0
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0

TABLE IA

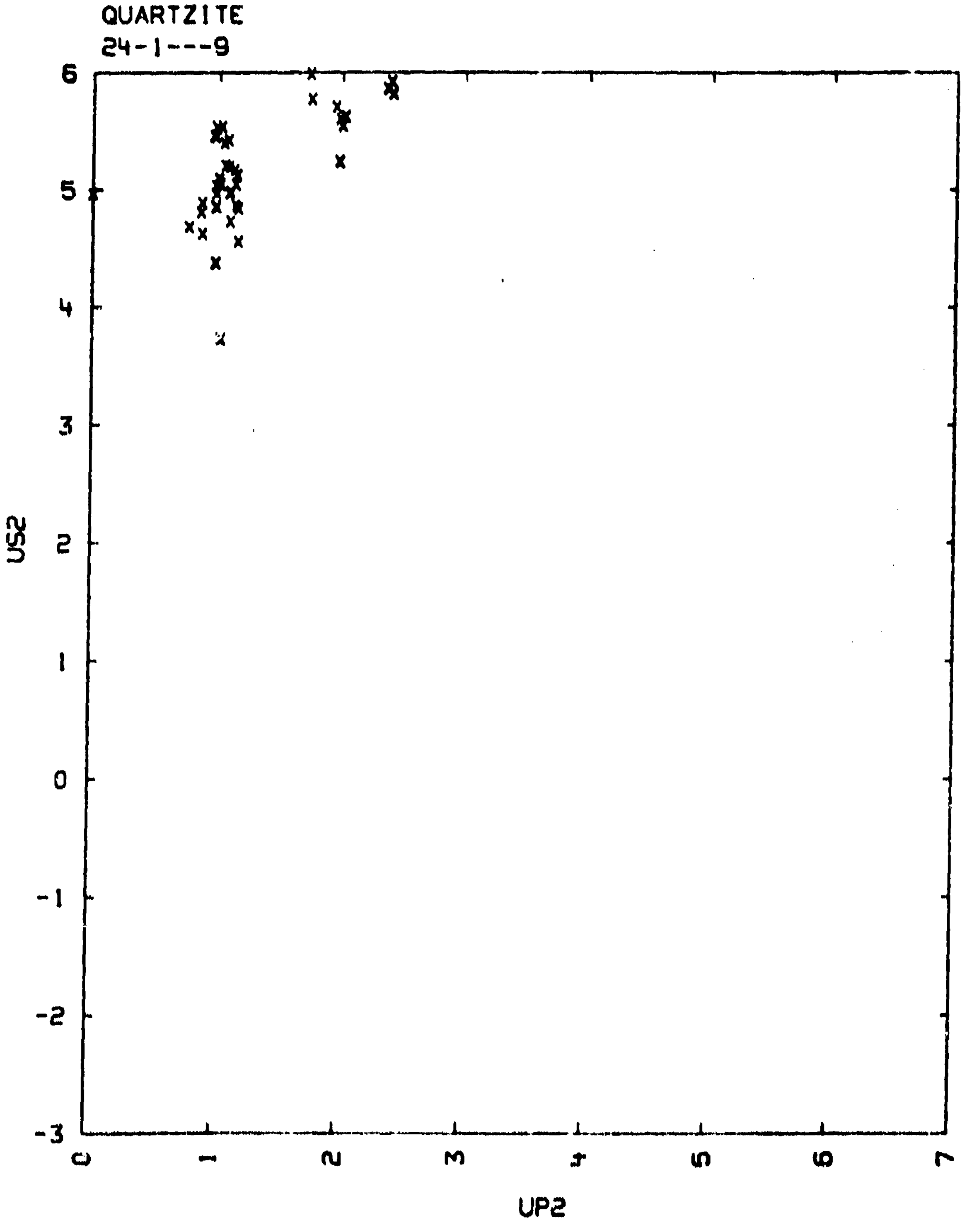
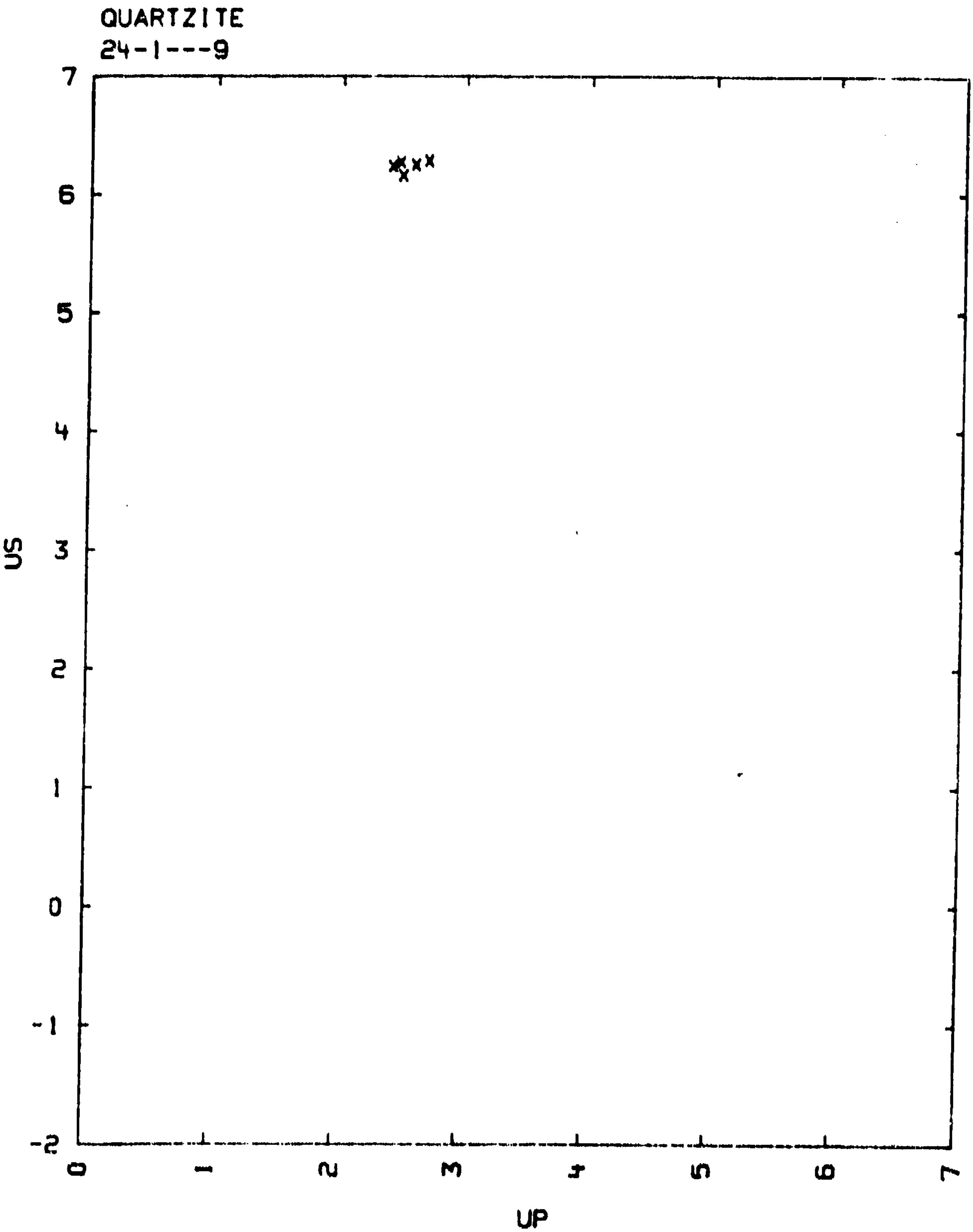


TABLE 1B



24-1---10
QUARTZ CRYSTAL (SILICONDIOXIDE)

SI-02

V0 = 0.3767 CC/G
V01= 0.3774 CC/G

THE TABLE GIVES PRESSURE IN KBARS VELOCITIES IN KM/SEC AND DENSITY IN G/CC. AXIS GIVES THE PROPAGATION DIRECTION OF THE SHOCK WAVE. D IS SAMPLE THICKNESS IN MM.

TABLE I

RHO0	US1	UP1	P1	V1/V0	US2	UP2	UFS2	P2	V2/V0	D	AXIS
2.654	5.9	0.66	102	0.888	5.42	2.01	3.3	295	0.559	3.40	X
-	6.27	0.54	89	0.914	5.72	1.94	3.17	299	0.604	6.38	X
-	6.427	0.537	91.6	0.916	5.661	1.93	3.29	298	0.602	6.60	Y
-	7.25	0.81	157	0.888	5.92'	2.40	3.38	401	0.528	6.60	Z

US =

TABLE II

RHO0	US	UP	UFS	P	V/V0	D	AXIS
2.654	5.635	1.815	3.48	272	0.678	6.40	X
-	5.696	1.803		272.5	0.684	3.22	X
-	5.685	1.98	3.356	298	0.652	6.38	X
-	5.79	2.46	4.13	377	0.575	6.38	X
-	5.78	2.48	4.10	380	0.571	3.39	X
-	6.003	2.61	4.29	416	0.565	6.38	X
-	5.82	2.46	4.08	379	0.578	6.60	Y
-	6.218	2.58	4.19	426	0.585	6.60	Y

US =

COMMENTS:

1) SOURCE: AHRENS, T. J. AND ROSENBERG, J. T.
CONFERENCE ON SHOCK METAMORPHISM (1966)
POULTER LABORATORIES, PALO ALTO, CALIF.

2) EXPERIMENTAL TECHNIQUE: C2
DATA REDUCTION METHOD: B STANDARD MATERIALS 2024 ALUMINUM
356 BRASS
D WITH UP1=1/2*UFS1 FOR THE ELASTIC WAVE.

3) V01 WAS OBTAINED FROM THE HEXAGONAL LATTICE PARAMETERS A=4.91265 AND C=5.40441 ANGSTROM; CRYSTAL DATA DETERMINATIVE TABLES, MONOGRAPH 5 (AMERICAN CRYSTALLOGRAPHIC ASSOCIATION, POLYCRYSTAL BOOK SERVICE.

BROOKLYN, N.Y., 1963) 2ND ED.
4) AS IN MATERIAL 24-1---9 VOLUMES CALCULATED FROM RELEASE ISENTROPES
DENSER THAN THE ORIGINAL QUARTZ.
INDICATED THAT THE RELEASED MATERIAL IS BETWEEN 7 AND 32 PERCENT

TABLE II

QUARTZ CRYSTAL (SILICONDIOXIDE)

24-1---10

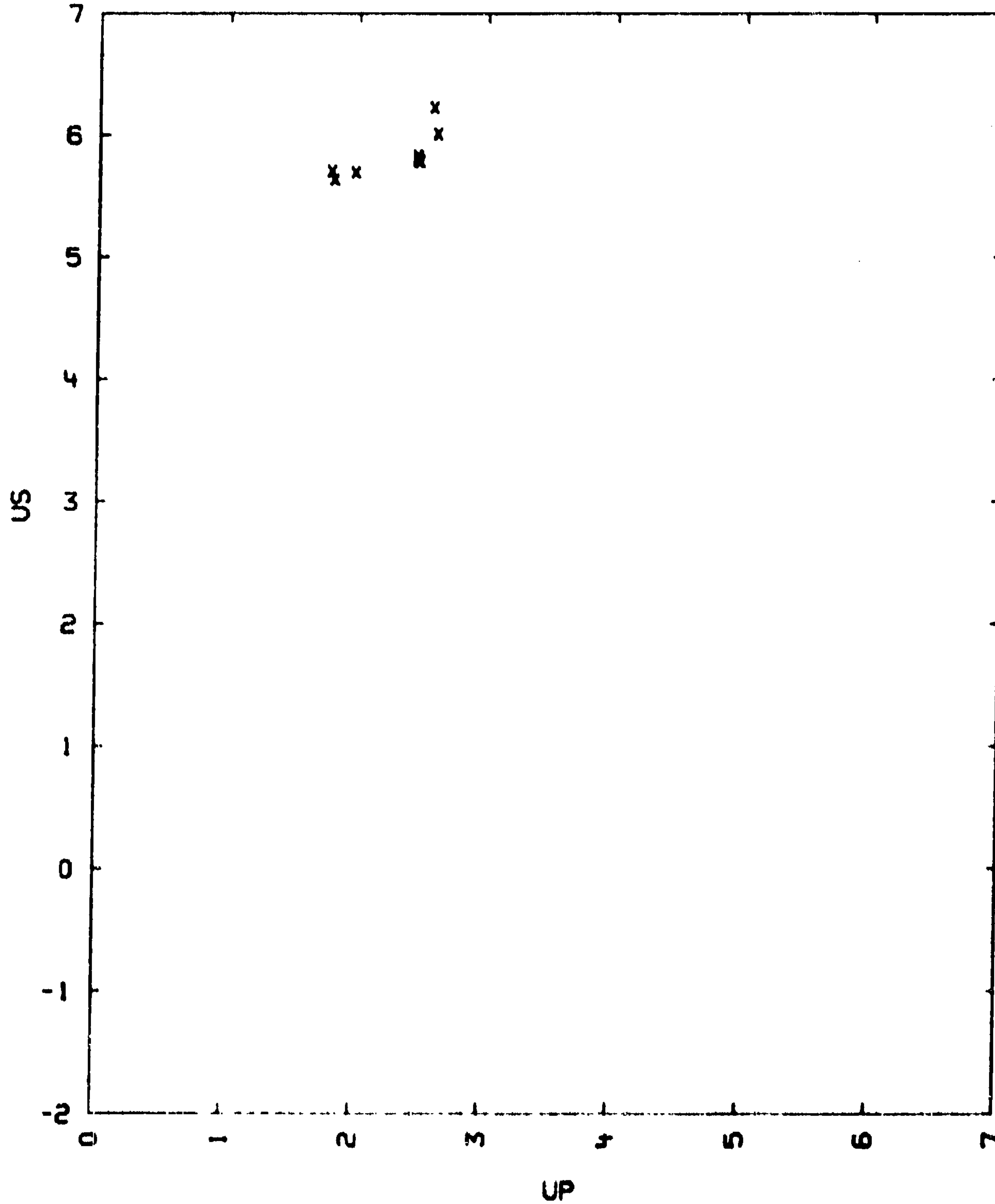


TABLE I

QUARTZ CRYSTAL (SILICONDIOXIDE)

24-1---10

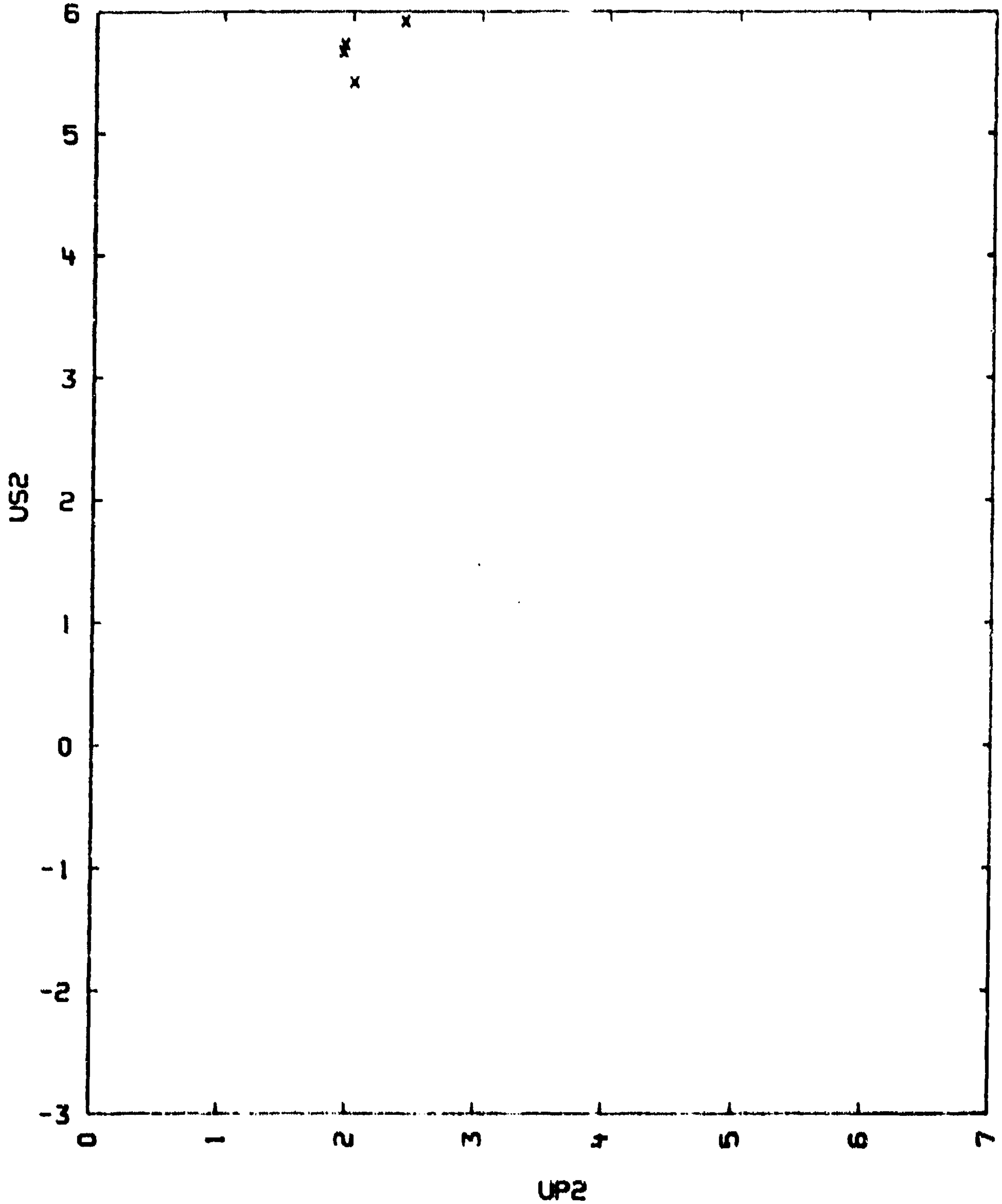
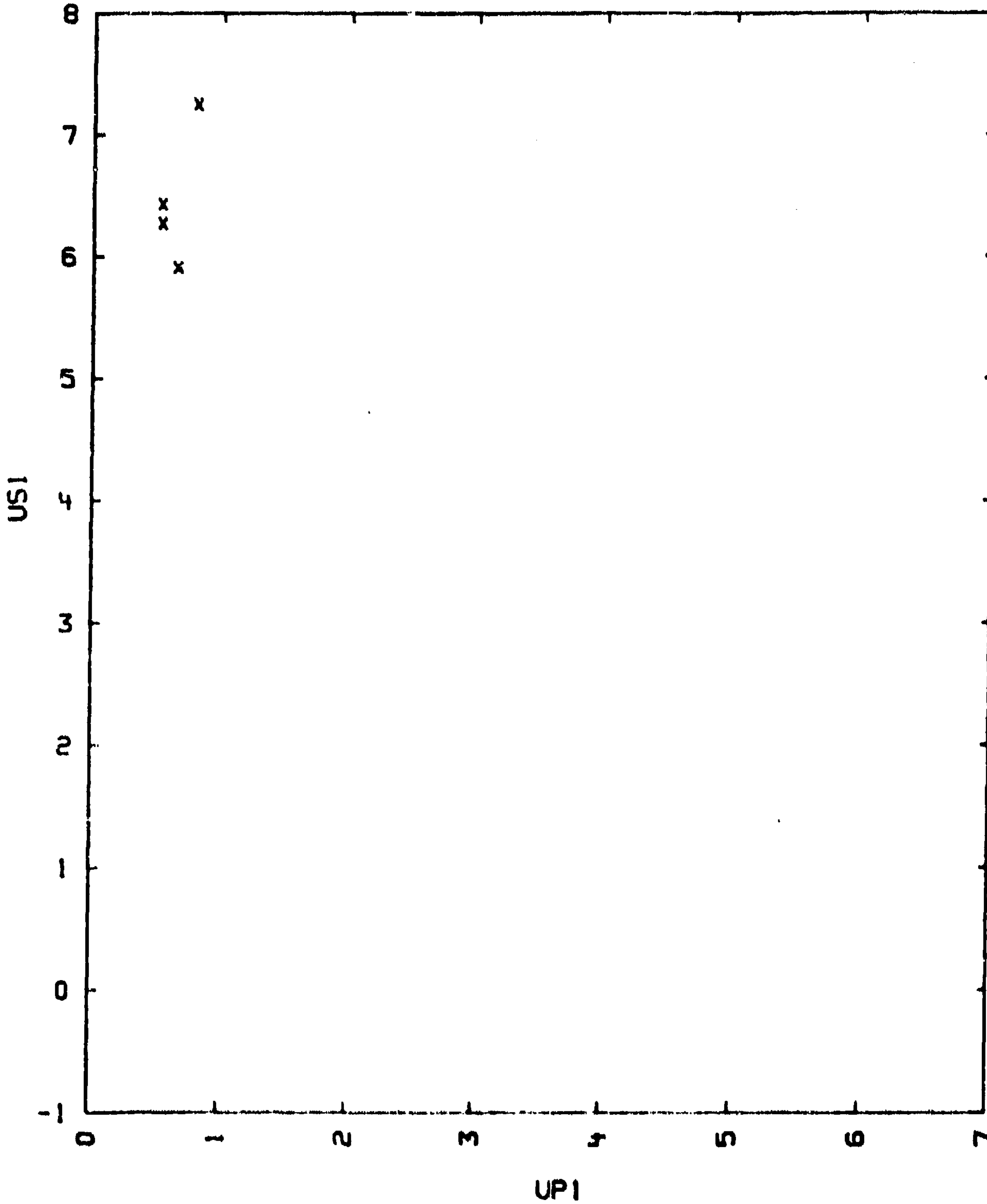


TABLE I

QUARTZ CRYSTAL (SILICONDIOXIDE)

24-1---10



24-1---11
QUARTZ (SAND)

SI-O2 100 PERCENT BY WT
POROSITY 37 PERCENT BY VOL.
PARTICLE SIZE 74-149 MICRONS

VO = 0.606 CC/G
VOI = 0.3774 CC/G

IN THE TABLE BELOW, TEMPERATURE (TO) IS GIVEN IN DEGREES CENTIGRADE,
DENSITY IS IN G/CC, VELOCITIES IN KM/SEC AND PRESSURE IN KILOBARS.

TABLE

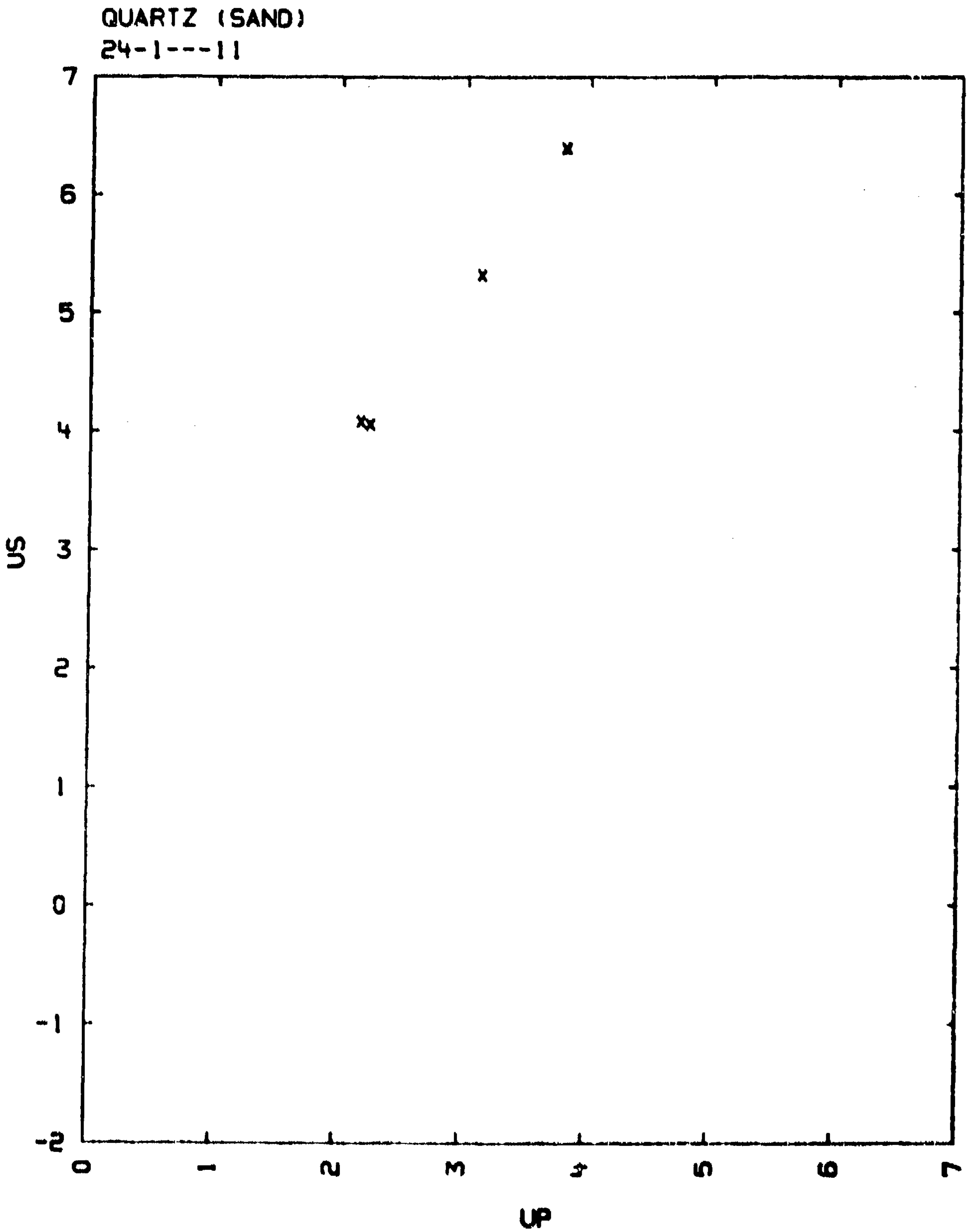
TO	RHOO	US	UP	P	V/VO
-10	1.65	4.07	2.17	146	0.467
-10	1.65	4.05	2.25	150	0.445
-10	1.65	5.31	3.13	274	0.410
-10	1.65	6.39	3.81	404	0.402

US = 0.868 + 1.44*UP KM/SEC   SIGMA US = 0.09 KM/SEC

COMMENTS:

1) SOURCE: ANDERSON, G. D.
   INTERIM DATA REPORT FGU-6392 (1967)
   STANFORD RESEARCH INSTITUTE, MENLO PARK, CALIFORNIA, USA.
2) EXPERIMENTAL TECHNIQUE D.
   DATA REDUCTION TECHNIQUE B.
   STANDARD MATERIAL 2024 ALUMINUM
3) THE SAMPLE WAS OTTAWA BANDING SAND, OBTAINED FROM THE OTTAWA SILICA CO., OTTAWA, ILLINOIS, U.S.A..
4) VOI WAS CALCULATED WITH THE HEXAGONAL UNIT CELL CONSTANTS A = 4.91267 AND C = 5.40459 ANGSTROMS: A.C.A. MONOGRAPH NO. 5 (AMERICAN CRYST. ASSN., POLYCRYSTAL BOOKSERVICE, NEW YORK, N. Y., USA (1963)) 2ND ED.

TABLE I



24-1---12
QUARTZ (COCONINO SANDSTONE)

QUARTZ SI-O2	97 VOLUME PERCENT	
FELDSPAR:	3 - -	
K-AL-SI3-O8		
NA-AL-SI3-O8		
CA-AL2-SI2-O8		
CLAY AND HEAVY MINERALS	TRACE	
POROSITY (CALC.)	25 - -	
GRAIN SIZE	0.06 - 0.7 MM.	

V0 = 0.505 CC/G CO = 1.43 KM/SEC.
V01 =0.3774 CC/G.

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES ARE IN KM/SEC AND PRESSURE IN KILOBARS. CS = COCONINO SANDSTONE, FC = FUSED QUARTZ

TABLE

RHO0	US	UP	P	V/V0	MAT
1.98	3.67	1.33	97.	0.637	CS
-	4.10	1.63	132.	0.602	-
-	4.49	2.18	194.	0.514	-
-	4.84	2.57	256.	0.468	-
-	5.66	3.12	349.	0.449	-
-	5.79	3.25	373.	0.438	-
-	7.57	4.30	644.	0.432	-
-	7.79	4.43	684.	0.431	-
-	8.82	5.07	886.	0.425	-
-	10.09	5.94	1186.	0.411	-
-	11.20	6.43	1426.	0.426	-
2.204	11.42	6.34	1596.	0.445	FC

US = 0.36 + 1.67*UP KM/SEC. FOR THE CS DATA.

COMMENTS:

1) SOURCE: JONES, A. H., ISBELL, W. M., SHIPMAN, F. H., PERKINS, R. D., GREEN, S. J. AND MAIDEN, C. J.
INTERIM REPORT, CONTRACT NAS2-3427, 1968
GENERAL MOTORS TECH. CENTER, WARREN, MICHIGAN 48090
2) EXPERIMENTAL TECHNIQUE A:
DATA REDUCTION TECHNIQUE A
STANDARD MATERIALS: OFHC COPPER AND FANSTEEL-77 ALLOY. THE COPPER STANDARD US-UP HUGONIOT RELATIONSHIP IS GIVEN BY:
US = 3.96 + 1.497*UP KM/SEC. RHO0 = 8.93 G/CC
THE FANSTEEL US-UP HUGONIOT IS GIVEN BY:
US = 3.96 + 1.295*UP KM/SEC. RHO0 = 17.01 G/CC
3) THESE PRESSURES WERE ACHIEVED BY USING A TWO-STAGE LIGHT GAS GUN. THE PROJECTILE IMPACT VELOCITY AND TILT WERE MEASURED BY TWO TIMED

FLASH X-RAY SHADOWGRAPHS OF THE PROJECTILE.

4) THE ESTIMATED EXPERIMENTAL ERROR IN MEASURING US IS .2 - 2 PERCENT
UP IS PRECISE TO 0.2 PERCENT.

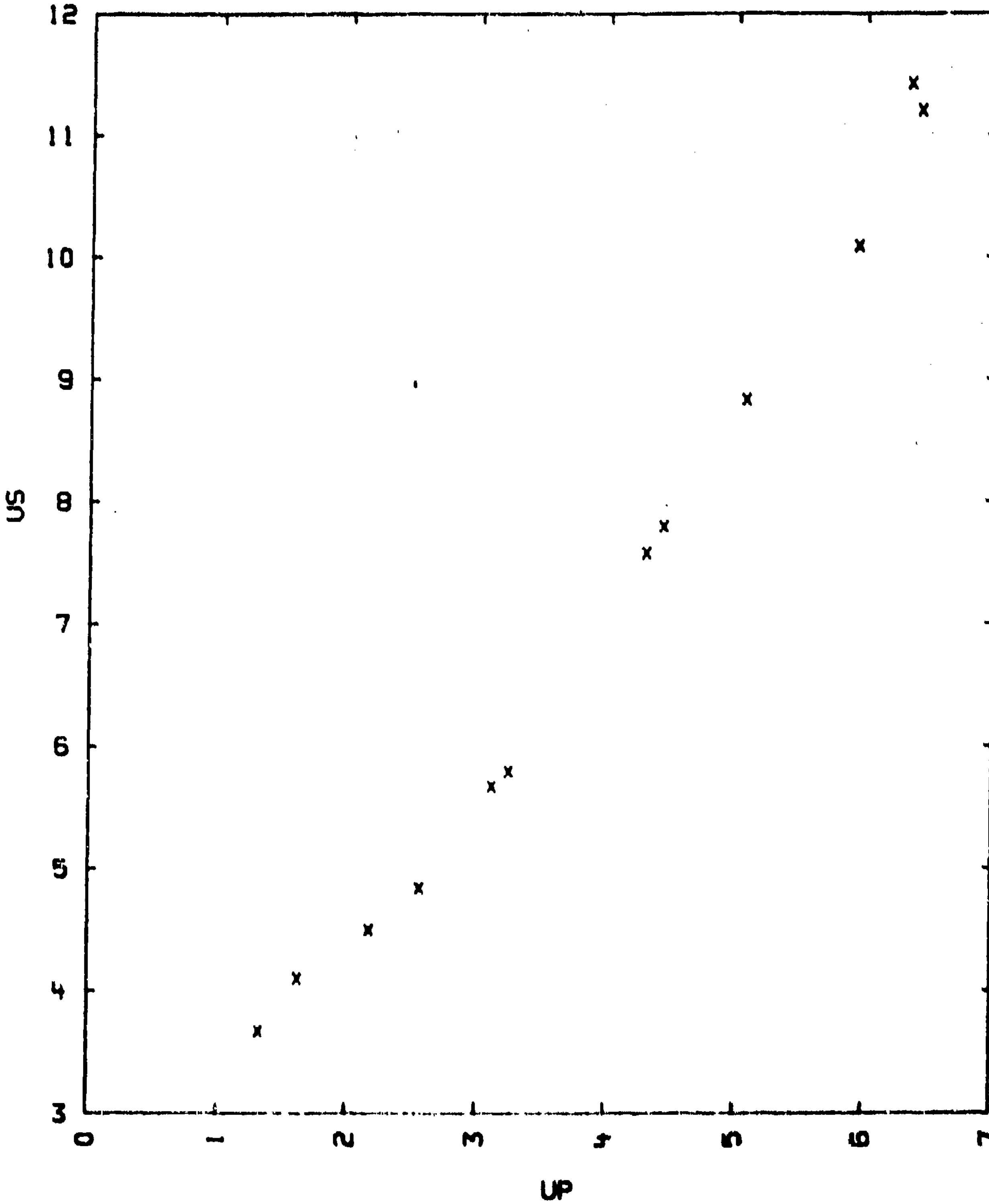
5) SAMPLE DESCRIPTION: SANDSTONE IS WEAKLY TO MODERATELY WELL CEMENTED WITH SILICA, IN THE FORM OF QUARTZ OVERGROWTHS ON THE GRAINS. SUBPARALLEL LAMINAE 5.0 TO 17.5 MM THICK SEPARATED BY THIN LAMINAE 0.5 MM THICK CONTAINING MORE THAN AVERAGE AMOUNTS OF SILT AND CLAY SIZED GRAINS.

6) THE UNCONFINED CRUSHING STRENGTH NORMAL TO BEDDING WAS 3.14(10**8) DYNES/(CM**2) FOR A DRY SAMPLE AND 3.64(10**8) DYNES/(CM**2) FOR A SAMPLE SATURATED WITH WATER

TABLE I

QUARTZ (COCONINO SANDSTONE)

24-1---12



24-23---1
SILICON CARBIDE

SI-C

VO = 0.3196-0.3211 CC/G   CL = 11.73 KM/SEC   CO = 8.00 KM/SEC
VOI = 0.3106-0.3088 CC/G   CS = 7.43 KM/SEC

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN KM/SEC, PRESSURE IN KILOBARS AND DENSITY IN G/CC.

TABLE I

SAMPLE					STANDARD	
RHOO	US	UP	P	V/VO	MATERIAL	US(ST)
3.124	10.77	0.46	155.	0.9573	2024 AL	6.22
3.114	10.05	0.67	210.	0.9333	2024 AL	6.52
3.127	9.99	0.92	287.	0.9079	2024 AL	6.90
3.120	9.88	1.37	422.	0.8613	2024 AL	7.53
3.110	9.56	1.56	464.	0.8368	2024 AL	7.76
3.128	9.83	1.67	513.	0.8301	2024 AL	7.93
3.116	9.78	1.93	588.	0.8027	2024 AL	8.26
3.126	10.03	2.16	677.	0.7846	2024 AL	8.59
3.123	10.42	2.47	804.	0.7630	2024 AL	9.03
3.115	10.65	2.79	926.	0.7380	2024 AL	9.45
3.124	10.83	2.83	957.	0.7387	2024 AL	9.53
3.113	10.70	3.00	999.	0.7196	2024 AL	9.71
3.129	10.59	3.20	1060.	0.6978	2024 AL	9.95
3.129	10.59	3.20	1060.	0.6978	2024 AL	9.95
3.124	10.84	3.24	1097.	0.7011	2024 AL	10.03
3.113	10.56	3.56	1170.	0.6629	CU	8.02

US = 8.000 + 0.950*UP KM/SEC   FOR UP GREATER THAN 1.7

TABLE II

SAMPLE					STANDARD	
RHOO	US	UP	P	V/VO	MATERIAL	US(ST)
2.368	5.93	2.05	288.	0.6543	2024 AL	7.65
2.295	6.34	2.24	326.	0.6467	2024 AL	7.88
2.364	6.91	2.44	399.	0.6469	2024 AL	8.19
2.423	7.19	2.48	432.	0.6551	2024 AL	8.30
2.307	6.86	2.52	399.	0.6327	2024 AL	8.24
2.311	7.42	2.86	490.	0.6146	2024 AL	8.67
2.292	8.14	3.15	588.	0.6130	2024 AL	9.08
2.308	6.37	3.19	469.	0.4992	2024 AL	9.16
2.302	8.21	3.27	618.	0.6017	2024 AL	9.22
2.357	8.51	3.44	690.	0.5958	2024 AL	9.48
2.302	8.82	3.82	776.	0.5669	2024 AL	9.88

US = -1.419 + 4.629*UP - 0.508*UP**2 KM/SEC

SILICON CARBIDE

RHOO	US	UP	P	V/VO	MATERIAL US(ST)

SIG US = 0.16 KM/SEC

COMMENTS:

1) SOURCE: MCQUEEN, R.G., MARSH, S.P., TAYLOR, J.W., FRITZ, J.N., AND CARTER, W.J. THE EQUATION OF STATE OF SOLIDS FROM SHOCK WAVE STUDIES, HIGH VELOCITY IMPACT PHENOMENA, KINSLOW (ED.) (ACADEMIC PRESS, NEW YORK, 1970) CHAPTER VII
2) EXPERIMENTAL TECHNIQUE:B
DATA REDUCTION TECHNIQUE: B
3) VOI IS LESS FOR THE CUBIC THAN THE RHOMBOHEDRAL AND HEXAGONAL STRUCTURES, WYCKOFF, CRYSTAL STRUCTURES (JOHN WILEY AND SONS, N.Y., 1963) VOL. 1
4) V(DP/DV) = 1.25
5) THE ELASTIC WAVE WAS NOT OVERDRIVEN IN THESE SHOTS. INTERCEPT WAS FORCED TO FIT CO

TABLE I

SILICON CARBIDE
24-23---1

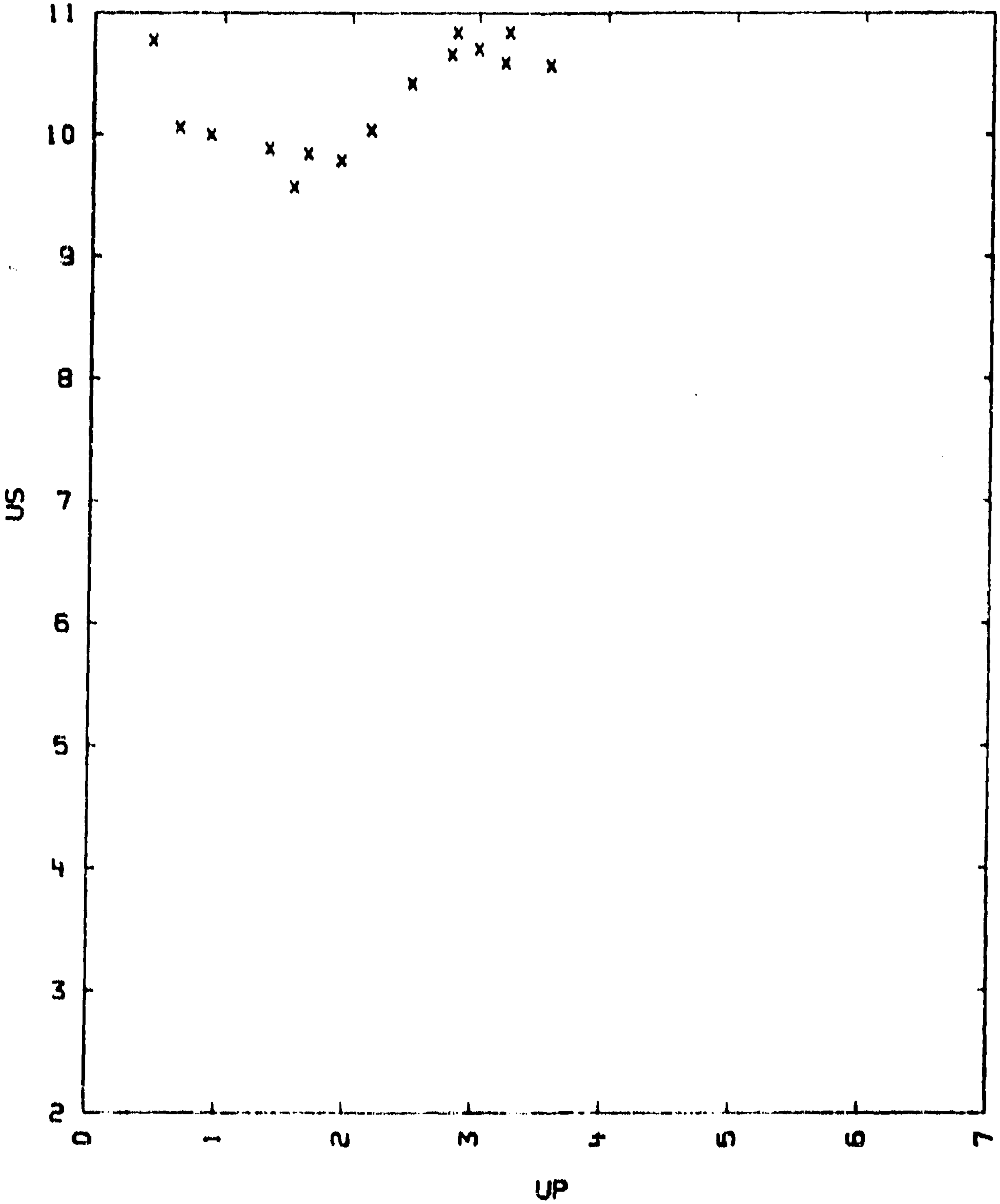
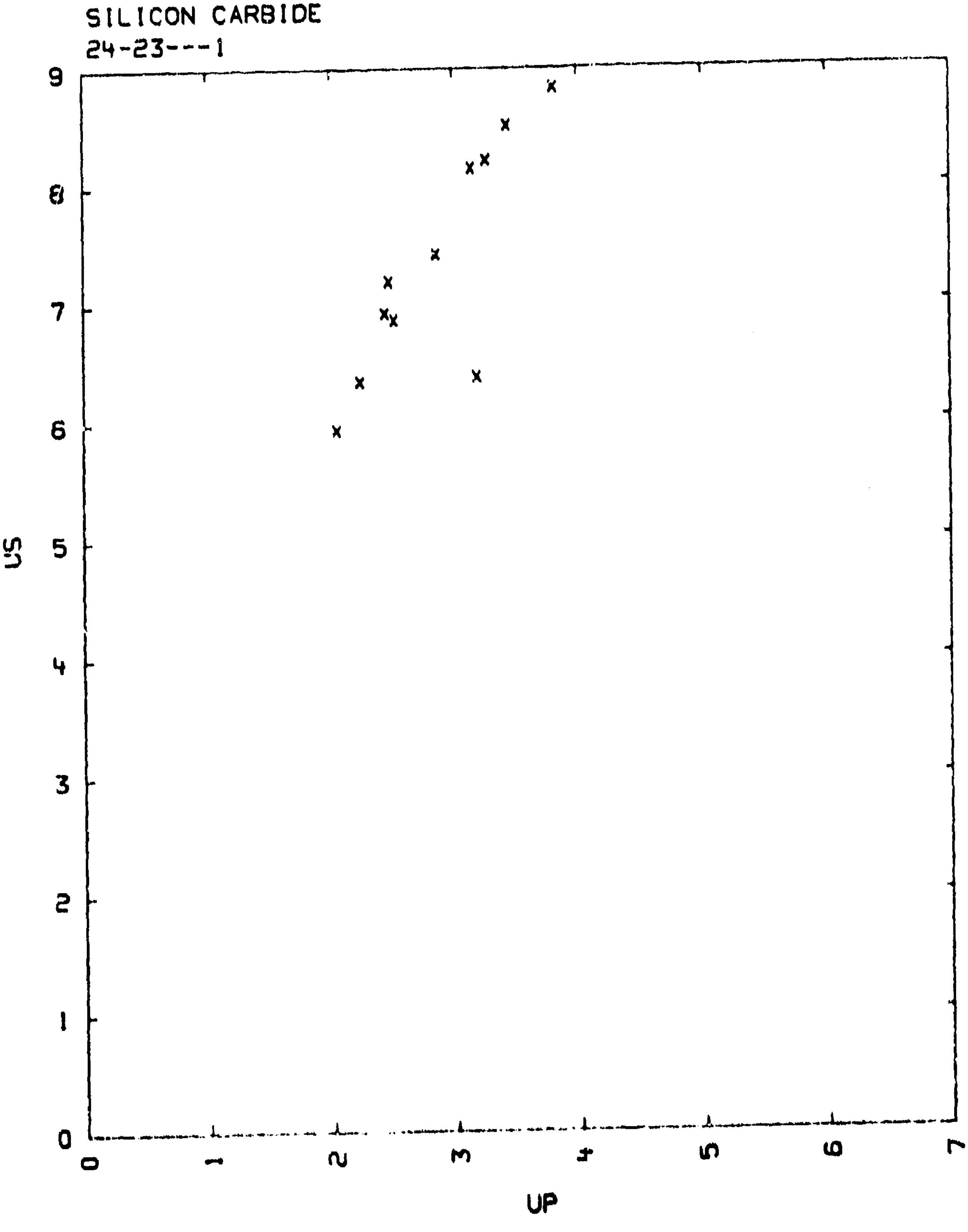


TABLE II



24-23-2-1190-182-546-891---1
POLYDIMETHYLSILOXANE (SILICONE 210 FLUID)

H3-C(-SI(C-H3)2-O)89-SI-(C-H3)3 = SI90-C182-H546-O89

TO = -32 TO 296. DEG. C. CO(23.5 DEG.C.)=0.99 KM/SEC.
VO = 0.983 TO 1.350 CC/G

THE TABLE LISTS TEMPERATURE IN DEG. C., DENSITY IN G/CC., VELOCITY IN KM/SEC. AND PRESSURE IN KBAR

TABLE

TO	RHOO	US	UP	P	V/VO
-32	1.017	6.72	3.18	216.	0.527
-20	1.006	6.91	3.46	240.	0.500
-20	1.006	4.87	1.87	91.	0.615
-10	0.996	7.11	3.11	256.	0.492
158	0.849	6.47	3.56	195.	0.450
158	0.849	6.61	3.72	208.	0.438
159	0.848	6.16	3.28	171.	0.4665
256	0.770	4.08	1.94	61.	0.523
279	0.752	6.09	3.31	152.	0.456
296	0.741	6.39	3.91	184.	0.390

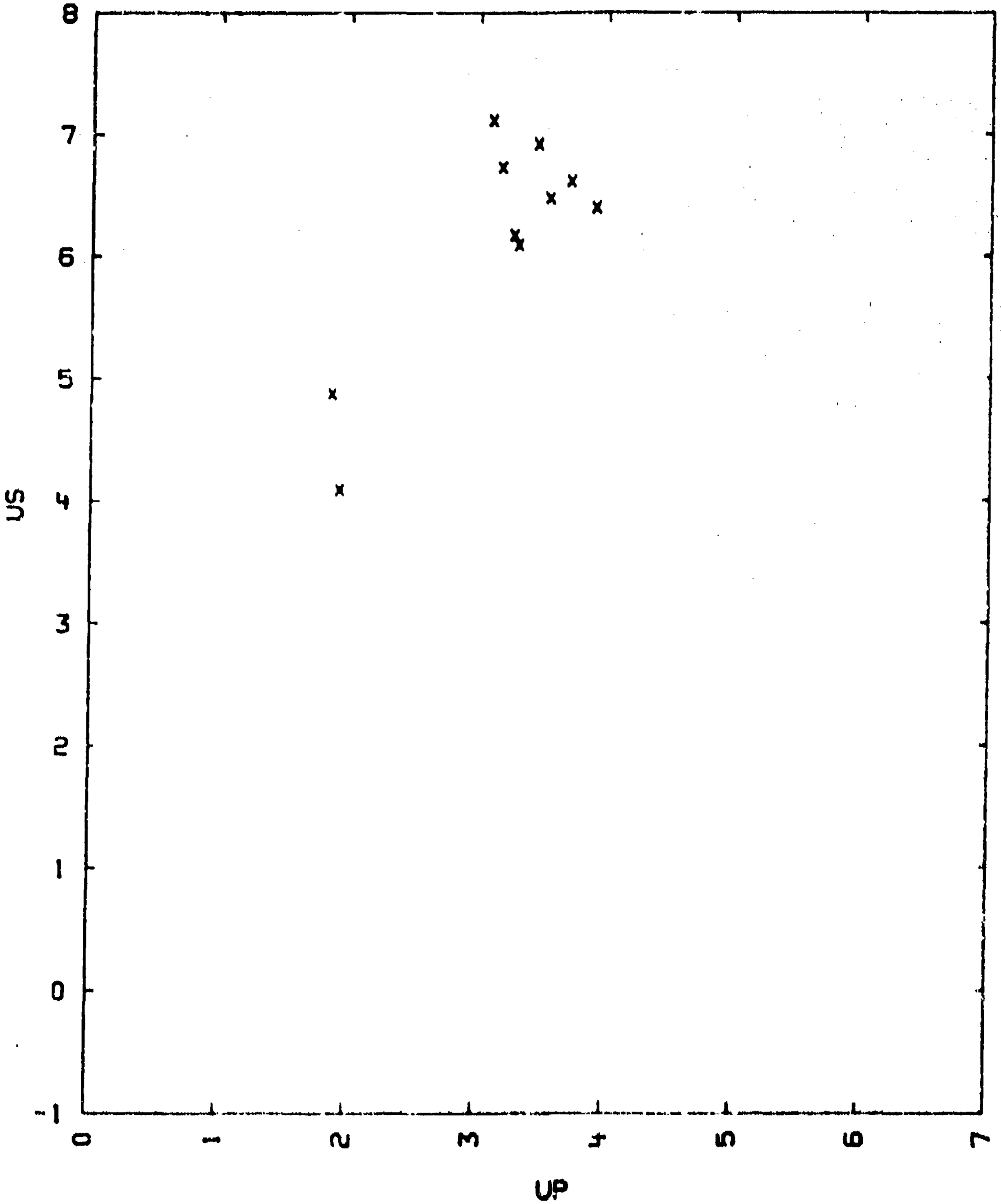
US =

COMMENTS
1) SOURCE: COWPERTHWAITE M. AND BLACKBURN J. H.
SRI TECHNICAL REPORT NO. 14
STANFORD RES. INST., MENLO PARK, CALIF. 94025, U.S.A.
2) EXPERIMENTAL TECHNIQUE: C1
DATA REDUCTION TECHNIQUE: B STANDARD MATERIAL, BRASS
3) ERROR ESTIMATES ARE BETWEEN 0.3 AND 1.5 PERCENT IN US AND UP.
4) THE STRUCTURE OF THIS FLUID WAS OBTAINED FROM
DOW CORNING ENG. PRODS. DIV. BULLETIN 05-108, DEC. (1964) AND
F. M. LEWIS, RUBBER CHEM. AND TECHN., VOL. 35, P. 1222 (1962)
PROPERTIES USED FROM THESE SOURCES WERE: VISCOSITY=100 CENTISTOKES
MOL.WT.=6700 G/MOLE
THE ABOVE MOLECULAR WEIGHT (AND SIZE) IS ONLY NOMINAL. THE LIQUID IS COMPOSED OF SOME UNKNOWN DISTRIBUTION OF MOLECULAR SIZES.
5) CO WAS MEASURED SEPARATELY BY REESE AND BLACKBURN, PRIVATE COMM.
THE TEMPERATURE DEPENDENCE MAY BE ESTIMATED FROM CO = 1.09*RHOO**3
SEE DATA TAKEN BY H. J. MCSKIMIN, J. ACCOUST. SOC. AM., VOL. 29
P. 1185 (1957).

TABLE I

POLYDIMETHYLSILOXANE (SILICONE 210 FLUID)

24-23-2-1(90-182-546-89)---1



26-1---1
CASSITERITE (TIN STONE) (TIN OXIDE)

SN-02

VO = 0.148 TO 0.155 CC/G
VOI= 0.1429 CC/G

THE TABLE LISTS SHOCK AND PARTICLE VELOCITY IN KM/SEC., PRESSURE IN KBARS AND DENSITY IN G/CC. ST DESIGNATES THE STANDARD SAMPLE HOLDER MATERIAL.

TABLE

RHOO	US	UP	P	V/VO	US(ST)
6.45	6.77	2.27	992	0.664	9.26
6.52	6.77	2.31	1021	0.659	9.33
6.75	6.94	2.55	1193	0.633	9.75
6.74	7.32	2.73	1348	0.627	10.10
6.51	7.51	2.88	1410	0.616	10.29

US = 3.881 + 1.248*UP KM/SEC.
SIGMA US = 0.083 KM/SEC.

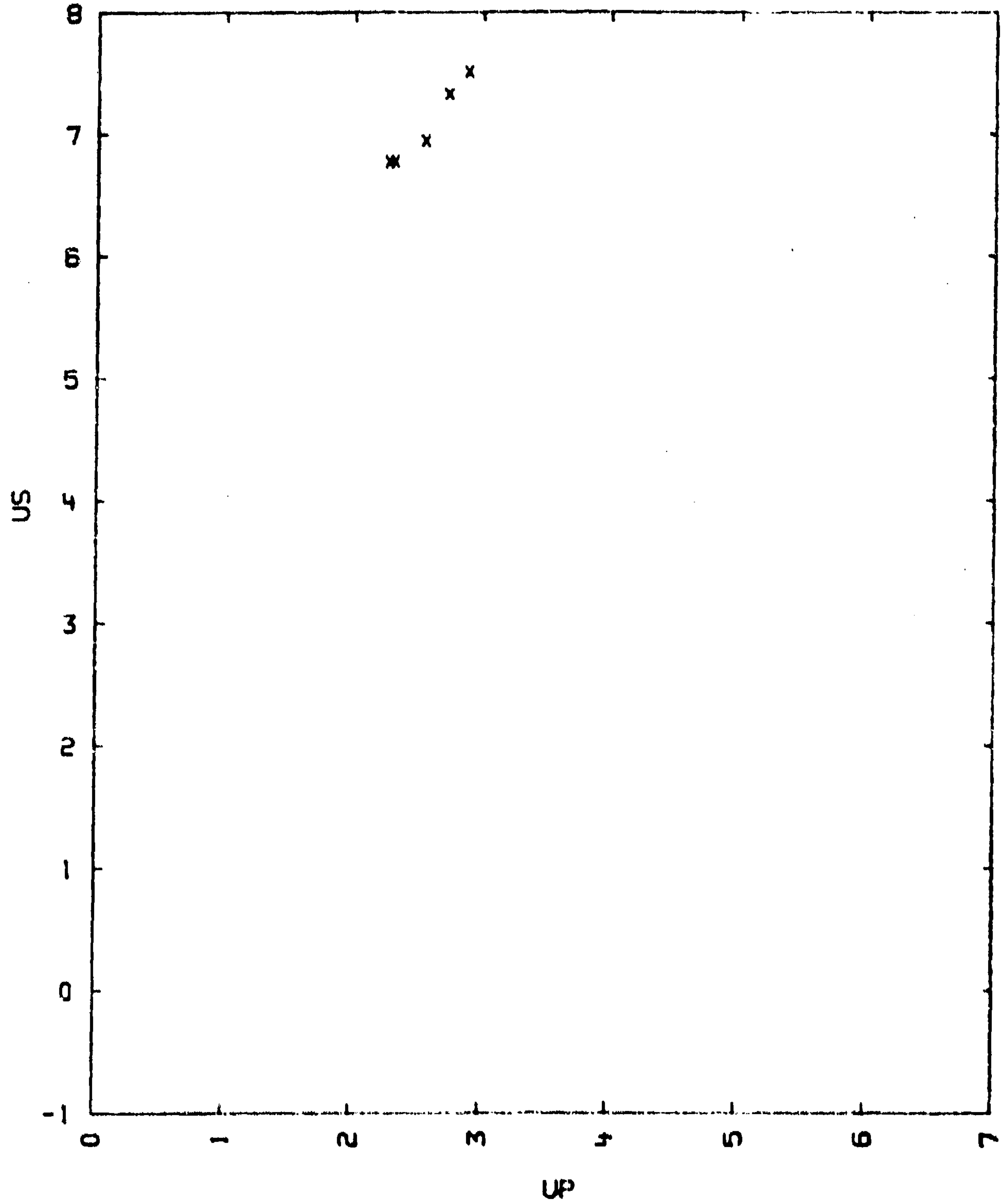
COMMENTS :

1) SOURCE: MCQUEEN R.G. AND MARSH S.P.
PRIVATE COMMUNICATION
LOS ALAMOS SCIENTIFIC LABORATORY, LOS ALAMOS, NEW MEXICO, USA
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION METHOD B STANDARD MATERIAL 2024 ALUMINUM
3) VOI WAS OBTAINED FROM THE LATTICE PARAMETERS LISTED BY WYCKOFF
CRYSTAL STRUCTURES, VOL 1 (JOHN WILEY AND SONS, NEW-YORK, 1963)
4) FURTHER WORK IS IN PROGRESS.

TABLE I

CASSITERITE (TIN STONE) (TIN OXIDE)

26-1---1



28-18---1
BORON NITRIDE PYROLYTIC

B-N

VO = 0.468 CC/G CL = 2.77 KM/SEC
VO1 = 0.4389 CC/G

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN KM/SEC, AND PRESSURE IN KILOBARS. X DENOTES THE SAMPLE THICKNESS IN MM.

TABLE

SAMPLE							STANDARD	
X	RHOO	US	UP	UFS	P	V/VO	US	UFS
6.35	2.162	4.92	0.712		76	0.855	6.16	1.22
3.18	2.168	4.65	0.725	1.54	73	0.844	6.16	1.22
6.35	2.129	6.13	1.54		201	0.749	6.98	2.61
3.18	2.120	6.15	1.54	3.03	201	0.750	6.98	2.61
6.35	2.044	6.53	2.13		284	0.674	7.67	3.60
3.18	2.178	6.47	2.09	4.02	294	0.677	7.67	3.60
6.35	2.101	7.35	2.51		388	0.659	8.27	4.42
3.18	2.165	6.94	2.54	4.60	382	0.634	8.27	4.42
6.35	2.067	7.43	2.71		416	0.635	8.39	4.74
3.18	2.117	7.29	2.70	5.14	417	0.630	8.39	4.74
6.35	2.153	7.65	3.16		520	0.587	8.99	5.64
3.18	2.156	7.80	3.134	5.61	527	0.598	8.99	5.64
6.35	2.153	8.07	3.46		601	0.571	9.35	6.26
3.18	2.118	8.04	3.49	5.82	594	0.566	9.35	6.26
6.35	2.164	8.21	3.52		625	0.571	9.43	6.44
3.18	2.162	8.37	3.50	5.86	633	0.582	9.43	6.44

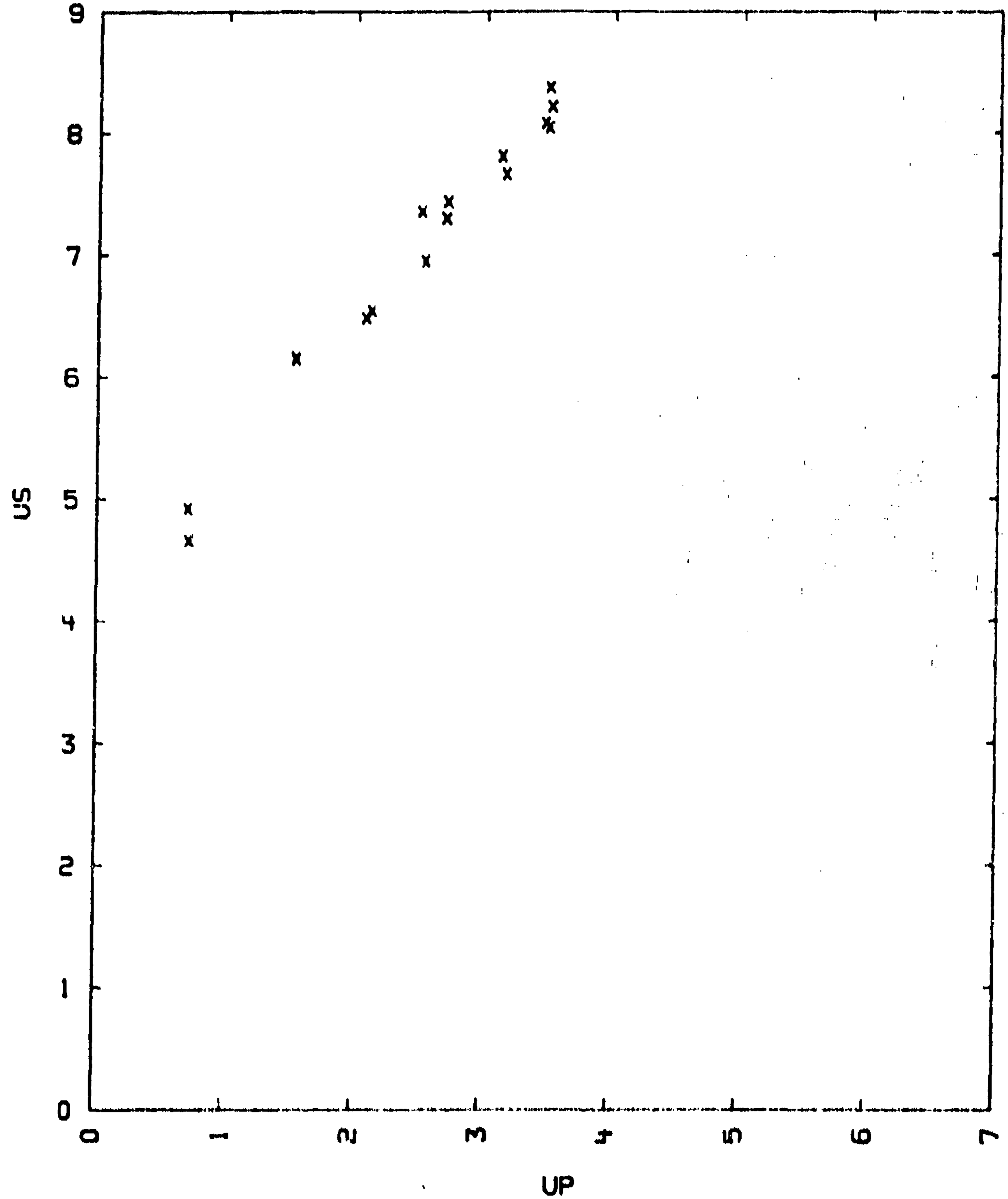
US = 3.82 + 1.54*UP - 0.088*UP**2 SIGMA US = 0.14 KM/SEC

COMMENTS:

1) SOURCE: HORD, B. L.
PRIVATE COMMUNICATION (1966)
LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA, USA.
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION TECHNIQUE B
STANDARD MATERIAL ALUMINUM 2024.
3) VO IS THE AVERAGE VOLUME OF ALL SAMPLES.
4) THE US-UP FIT WAS MADE WITH WEIGHTS OF 1.0 FOR THE 6.35-MM SAMPLES AND WEIGHTS OF 0.5 FOR THE 3.18-MM-THICK SAMPLES.
5) THE SAMPLE MATERIAL WAS OBTAINED FROM HIGH TEMPERATURE MATERIALS, INC., BRIGHTON, MASSACHUSETTS, USA.
6) VO1 WAS CALCULATED FROM THE HEXAGONAL CELL STRUCTURE, WITH AO = 0.50399 AND CO = 6.6612 ANGSTROMS, AT 35 DEG. CENTIGRADE. THE LATTICE CONSTANTS WERE OBTAINED FROM R. W. G. WYCKOFF, CRYSTAL STRUCTURES, VOL. 1 (JOHN WILEY AND SONS, NEW YORK, N. Y., USA., 1963) 2ND ED.

TABLE I

BORON NITRIDE PYROLYTIC
28-18---1



28-18---2
BORON NITRIDE, PYROLYTIC.

B-N

VO = 0.459 CC/G. CL = 2.743 KM/SEC. C' = 2.48 KM/SEC.
VOI = 0.4389 CC/G. CS = 1.048 KM/SEC.

THE TABLE LISTS DENSITY IN G/CC., VELOCITIES IN KM/SEC. AND PRESSURE IN KBAR.

TABLE

RHOO	US	UP	P	V/VO
2.18	3.64	0.310	24.6	0.9148
-	3.62	0.309	24.4	0.9147
-	3.41	0.237	17.6	0.9304
-	3.43	0.234	17.5	0.9318
-	3.09	0.162	10.9	0.9475
-	2.86	0.077	4.8	0.9731
-	3.47	0.237	17.9	0.9314
-	3.47	0.239	18.1	0.9310
-	2.86	0.081	5.05	0.9717
-	2.86	0.083	5.20	0.9708

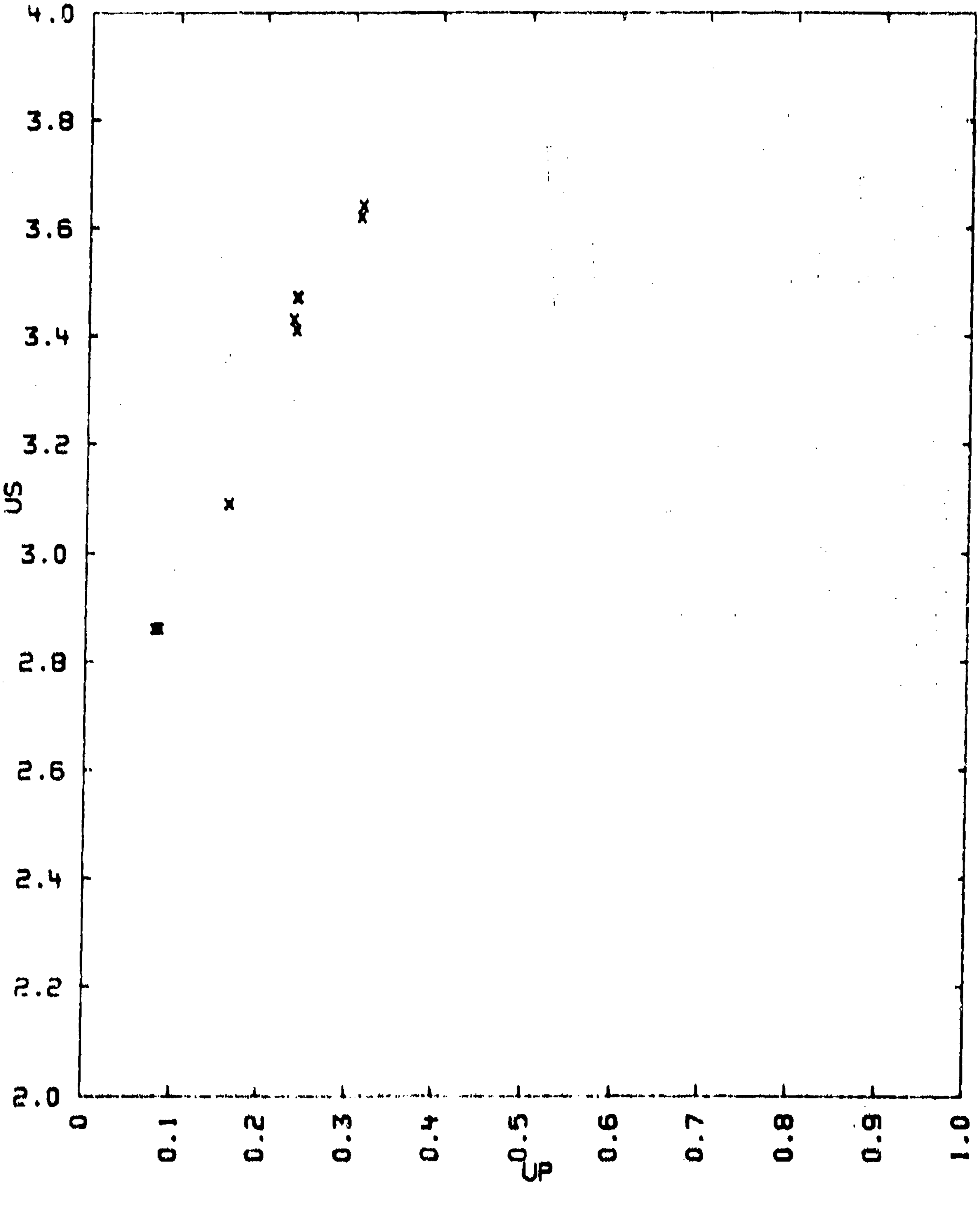
US = 2.58 + 3.50*UP KM/SEC
SIG.US = 0.04 KM/SEC

COMMENTS:

1) SOURCE: LEE L. M.
SANDIA LABORATORY REPORT SC-RR-2947 (1967)
SANDIA LABORATORY, ALBUQUERQUE, NEW-MEXICO, U.S.A.
2) EXPERIMENTAL TECHNIQUE: 12.
DATA REDUCTION TECHNIQUE: C (QUARTZ GAUGE)
3) THE SAMPLE FORMED PART OF THE BULLET AND IMPACTED THE QUARTZ GAUGE TO YIELD THE STRESS AT THE IMPACT SURFACE. IN THE REMAINING EXPERIMENTS THE GAUGE WAS PLACED ON THE SAMPLE SURFACE AND MEASURED TRANSMITTED PRESSURE. THEREFORE P AND UP ARE THE MEASURED PARAMETERS IN THE FIRST 6 ENTRIES. P AND US WERE MEASURED IN ENTRIES 8 AND 10. US AND UP (OBTAINED FROM THE PROJECTILE VELOCITY) WERE THE HUGONIOT PARAMETERS IN ENTRIES 7 AND 9.
4) NO WAVE ATTENUATION WAS OBSERVED HERE, BUT SEMISTATIC STRAIN RATE EXPERIMENTS SHOWED AN INCREASE OF 100 TO 110 BARS IN COMPRESSIVE STRESS BETWEEN STRAIN RATES OF 15 TO 10**3 INCH/(INCH.SEC.)
5) THE SAMPLE IS POLYCRYSTALLINE WITH THE C AXIS OF THE CRYSTALLITES ORIENTED PERPENDICULAR TO THE SHOCK FRONT. SEE DATA SHEET FOR BORAL-LAY, FEB. 1 1965, HIGH TEMP MATERIALS INC., UNION CARBIDE CORP. LOWELL, MASS., U.S.A.
6) VOI AS IN ENTRY 28-18---1

TABLE I

BORON NITRIDE, PYROLYTIC.
28-18---2



28-18---3
BORON NITRIDE, POROUS. (IPBN)

B-N
GRAIN SIZE 20 TO 100 ANGSTROM.

V0= 0.794 CC/G.
V01=0.4389 CC/G.
THE TABLE LISTS DENSITY IN G/CC., VELOCITIES IN KM/SEC. AND PRESSURE IN KBAR.

TABLE

RHO0	US1	UP1	P1	V1/V0	US2	UP2	P2	V2/V0
1.26	2.77	0.043	1.5	0.984	1.45	0.525	10.2	0.648
-	-	-	-	-	1.37	0.487	9.05	0.655
-	-	-	-	-	1.28	0.444	7.88	0.666
-	-	-	-		1.09	0.401	6.30	0.648
-	-	-	-		1.01	0.335	5.11	0.686
-	-	-	-		0.86	0.272	3.91	0.710
-	-	-	-		1.03	0.145	2.79	0.882
-	-	-	-		0.92	0.203	3.30	0.805
-	-	-	-		1.27	0.110	2.55	0.930

US2 = 2.03 + 2.37*UP KM/SEC.
SIG.US2 = 0.04 KM/SEC. FOR UP BETWEEN .27 AND .35 KM/SEC.
US2 = 2.77 - 19.1*UP + 49.0*UP**2 KM/SEC
SIG.US2 = 0.007 KM/SEC. FOR UP BELOW 0.20 KM/SEC.

COMMENTS:

1) SOURCE: LEE L. M.
SANDIA LABORATORY REPORT SC-RR-68-2 (1968)
SANDIA LABORATORY, ALBUQUERQUE, NEW MEXICO, U.S.A.
2) EXPERIMENTAL TECHNIQUE: 12
DATA REDUCTION TECHNIQUE: C
3) BOTH STRESS PROFILES TRANSMITTED THROUGH THE SAMPLE AND INPUT STRESS WERE MEASURED. THE FORMER SHOWED A BROAD PRECURSOR PROFILE WHICH WAS INTEGRATED ASSUMING CONSTANT VELOCITY FOR EACH STRESS POINT, TO YIELD THE APPROPRIATE MAXIMUM COMPRESSION AND UP1. V2/V0 AND US2 WERE THAN CALCULATED FROM THE INPUT STRESS (P2) AND PARTICLE VELOCITY (UP2), USING THE JUMP CONDITIONS, WHICH WERE ALSO USED TO CALCULATE US1 IN THE TABLE. THE MEASURED VELOCITY AT THE FOOT OF THIS BROAD WAVE US 3.30 +OR- 0.18 KM/SEC. THE VALUE OF US1 IN THE TABLE IS THE EFFECTIVE VALUE THAT FITS THE JUMP CONDITIONS.
4) THE MAXIMUM UNCERTAINTY IN P IS NEAR 5 PERCENT. THE AGREEMENT BETWEEN A CALCULATED US2 AND A AVERAGE SHOCK PROFILE VELOCITY CAME TO 3 PER-CENT: 1.29 CALC. AND 1.33 KM/SEC. MEASURED.
5) THE SAMPLE WAS ISOTROPIC PYROLYTIC BORON NITRIDE, IMPERMEABLE TO HE AT ONE ATMOSPHERE DIFFERENTIAL ACROSS A 0.08 CM SLAB.
IT WAS PRODUCED BY RAYTHEON CORPORATION.

TABLE I

BORON NITRIDE, POROUS. (IPBN)
28-18---3

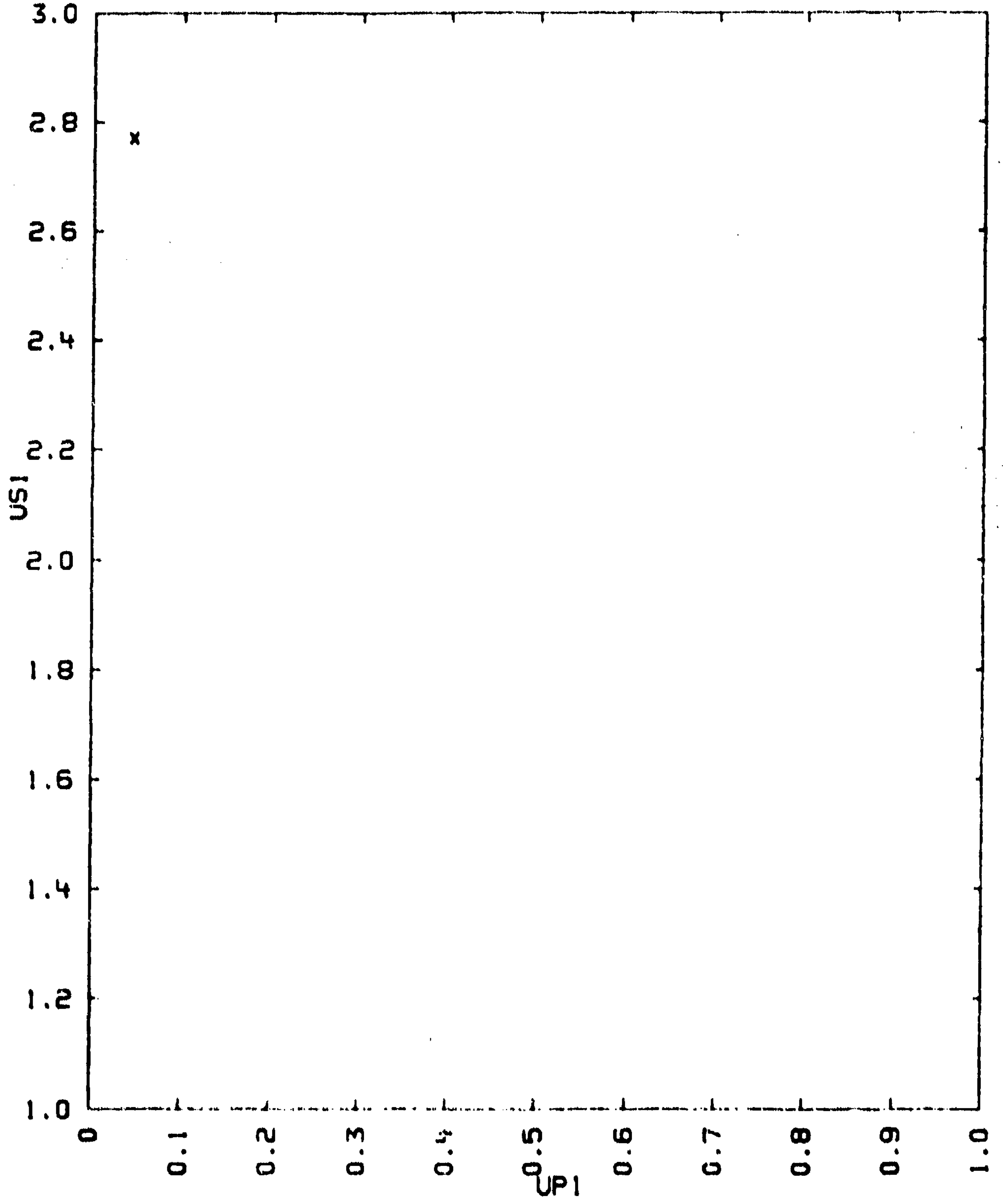
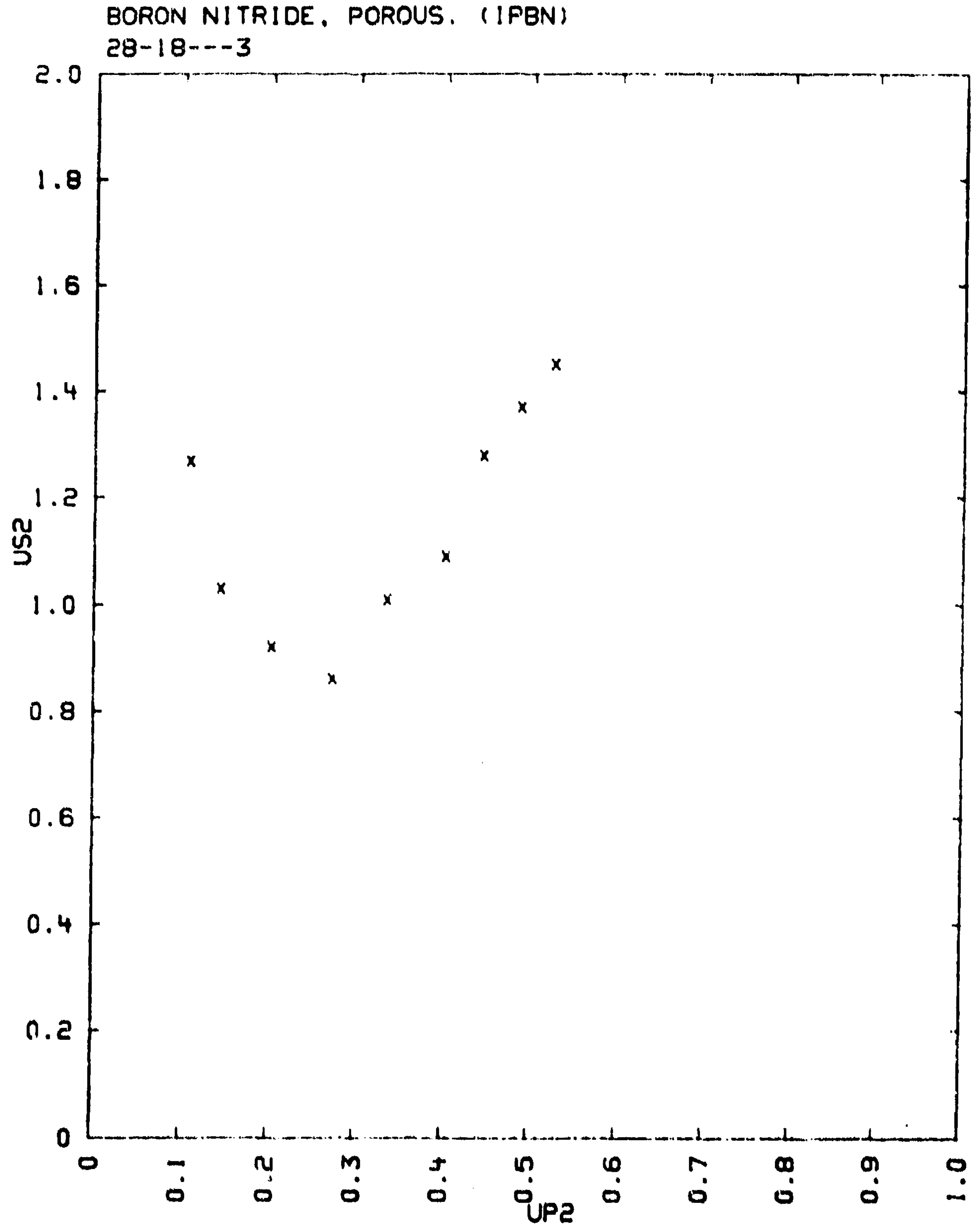


TABLE I


BORON NITRIDE, POROUS. (IPBN)
28-18---3
US2
UP2
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0

20-18---4
BORON NITRIDE, PYROLYTIC

B-N

VO = 0.459-0.476 CC/G   CL = 2.743 KM/SEC   CO = 2.462 KM/SEC.
VOI= 0.4389 CC/G   CS = 1.048 KM/SEC

THE TABLE LISTS DENSITY IN G/CC., VELOCITIES IN KM/SEC AND PRESSURE IN KBAR.

TABLE

RHOO	US	UP	P	V/VO
2.18	6.441	2.298	322.7	0.643
2.08	6.54	2.14	291.	0.67
2.12	6.47	2.07	265.	0.68
2.18	6.093	2.047	271.9	0.664
2.18	6.059	2.051	270.9	0.661
2.12	6.10	1.81	237.	0.70
2.149	5.91	1.63	206.0	0.72
2.149	5.71	1.40	171.0	0.76
2.149	5.63	1.38	167.0	0.76
2.10	5.371	1.468	165.6	0.727
2.12	5.59	1.40	166.	0.75
2.18	5.568	1.345	163.3	0.758
2.149	5.36	1.07	123.0	0.80
2.18	5.086	1.032	114.4	0.797
2.18	5.070	1.033	114.2	0.796
2.149	4.843	0.802	83.5	0.834
2.149	4.776	0.804	82.6	0.832
2.15	4.42	0.79	75.	0.82
2.12	4.57	0.77	74.	0.83
2.12	4.911	0.707	73.6	0.856
2.12	4.786	0.719	73.0	0.850
2.10	4.404	0.672	62.2	0.847
2.149	4.406	0.463	43.9	0.895

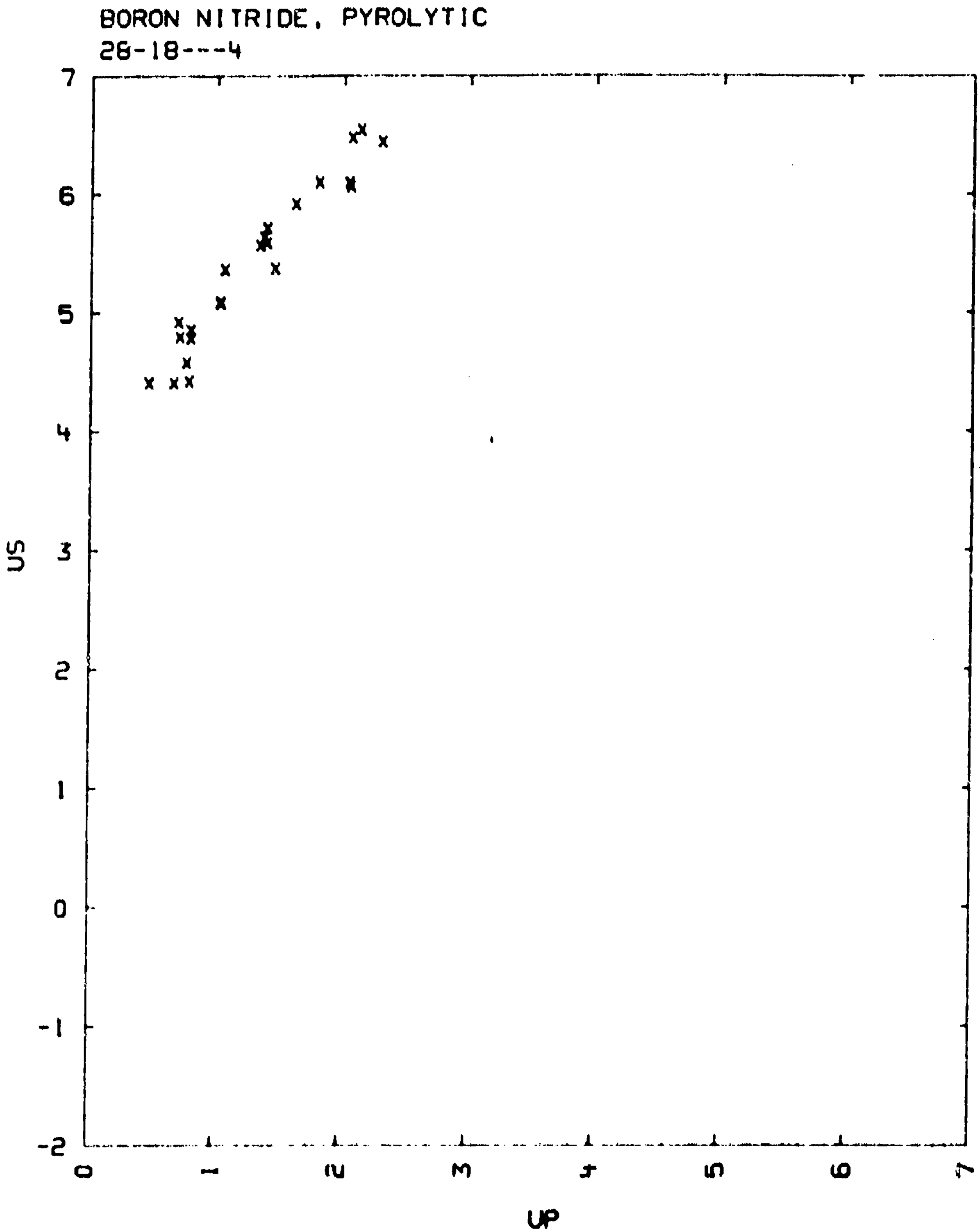
US = 3.83 + 1.20*UP KM/SEC
SIG US = 0.17 KM/SEC.

COMMENTS

1) SOURCE: MAY, R. P. AND KINSEY, C. H.
SANDIA LABORATORY REPORT SC-TM-67-534, JULY 1967.
SANDIA CORP., ALBUQUERQUE, NEW MEXICO
2) EXPERIMENTAL TECHNIQUE: A
DATA REDUCTION METHOD: B
3) POLYCRYSTALLINE, PURE HEXAGONAL BORON NITRIDE FROM CARBON PRODUCTS DIV OF UNION CARBIDE CORP. SAME MATERIAL AS 20-18---2
4) CL, CS AND CO MEASURED ALONG THE CRYSTALOGRAPHIC C AXIS.
T. GUESS AND G. W. KEY, ELASTIC CONSTANTS AND GRUNEISEN TENSOR FOR

PYROLYTIC BORON NITRIDE. MEMO TO DISTRIBUTION, FEB. 28 (1967)
SANDIA LABORATORY, ALBUQUERQUE, NEW MEXICO, U.S.A.
5) VCI WAS CALCULATED AS IN 28-IR---I
6) PRELIMINARY DATA. WORK IN PROGRESS.

TABLE I



28-23---1
BORON CARBIDE

B4-C

VO = 0.5051-5.294 CC/G
VOI = 0.4011 CC/G

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN KM/SEC, PRESSURE IN KILOBARS AND DENSITY IN G/CC.

TABLE

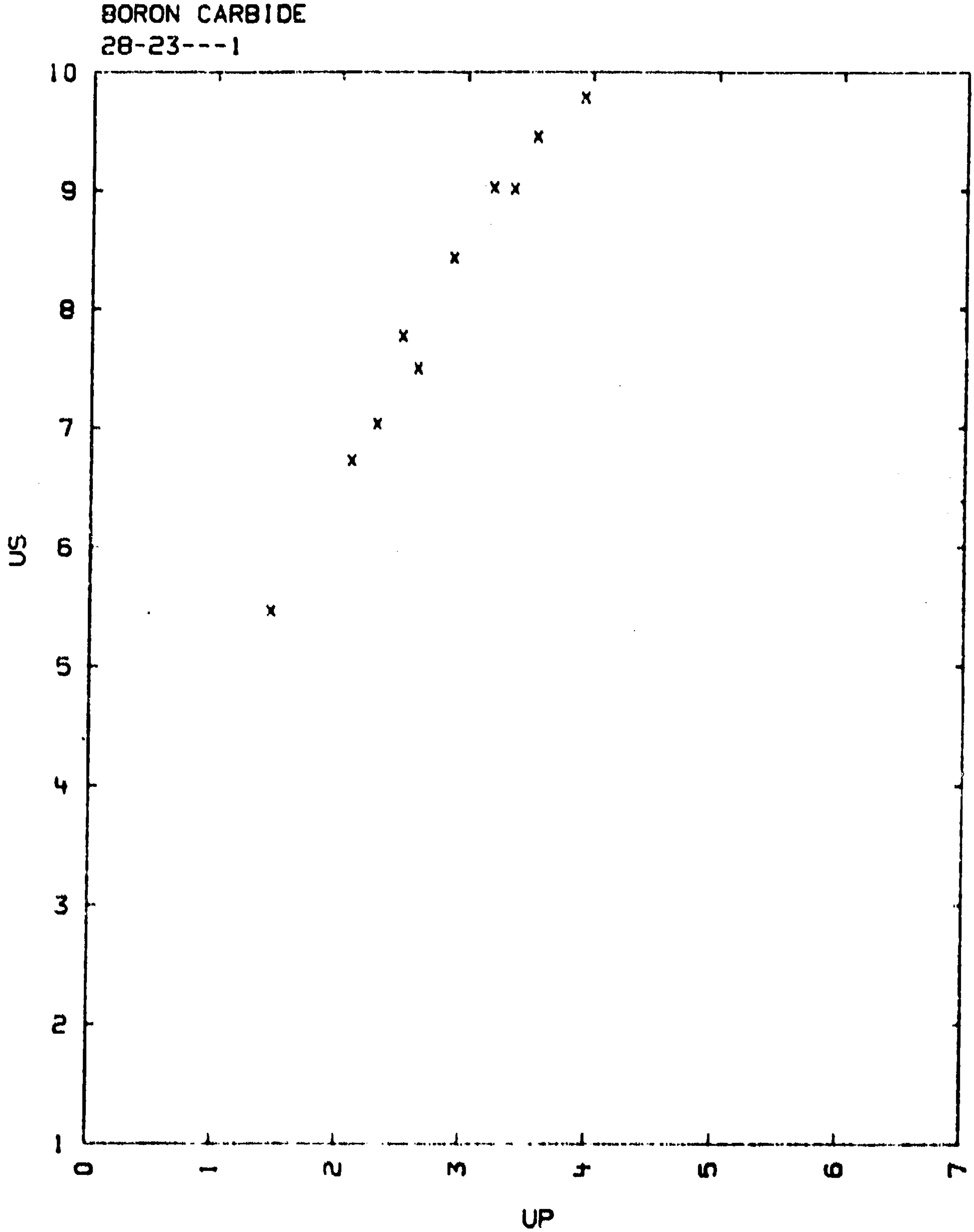
SAMPLE					STANDARD	
RHOO	US	UP	P	V/VO	MATERIAL	US(ST)
1.980	5.48	1.47	159.	0.7308	2024 AL	6.90
1.948	6.72	2.10	275.	0.6875	2024 AL	6.75
1.924	7.03	2.30	311.	0.6728	2024 AL	7.88
1.970	7.77	2.50	383.	0.6782	2024 AL	8.19
1.889	7.50	2.62	371.	0.6507	2024 AL	8.24
1.944	8.43	2.90	475.	0.6560	2024 AL	8.67
1.937	9.02	3.22	563.	0.6430	2024 AL	9.08
1.909	9.01	3.38	581.	0.6249	2024 AL	9.22
1.940	9.45	3.56	653.	0.6233	2024 AL	9.48
1.903	9.78	3.94	733.	0.5971	2024 AL	9.88

US = 1.506 + 2.943*UP -0.207*UP**2 KM/SEC
SIG US = 0.18 KM/SEC

COMMENTS:

1) SOURCE: MCQUEEN, R.G., MARSH, S.P., TAYLOR, J.W., FRITZ, J.N., AND CARTER, W.J.
THE EQUATION OF STATE OF SOLIDS FROM SHOCK WAVE STUDIES, HIGH VELOCITY IMPACT PHENOMENA, KINSLOW (ED.) (ACADEMIC PRESS, NEW YORK, 1970) CHAPTER VII
2) EXPERIMENTAL TECHNIQUE: B
DATA REDUCTION TECHNIQUE: B (STANDARD BASE PLATE AS SHOWN)
3) VOI IS CALCULATED FROM THE HEXAGONAL CEL CONSTRANTS AO = 5.60 AND CO = 12.12 ANGSTROM. CRYSTAL DATA DETERMINATIVE TABLES , ED. J.D.H. DONNAY AND H.M. ONDIK (U.S. DEP. OF COMM., N.B.S.,MD., 1973) 3RD. ED

TABLE I



29-1---1
CORUNDUM (ALUMINUM OXIDE CRYSTALLINE)

AL2-O3

VO = 0.2508 CC/G
VOI= 0.2515 CC/G

CO = 7.93 KM/SEC.

THE TABLE LISTS SHOCK AND PARTICLE VELOCITY IN KM/SEC., PRESSURE IN KBARS AND DENSITY IN G/CC. ST DESIGNATES THE STANDARD SAMPLE HOLDER MATERIAL.

TABLE

RHOO	US	UP	P	V/VO	US(ST)
3.98	9.99	1.30	516	0.869	7.72
3.98	10.51	1.66	693	0.841	8.32
3.99	11.02	1.98	871	0.821	8.86
3.99	11.17	2.20	979	0.804	9.18
3.99	11.28	2.24	1006	0.803	9.26
3.99	11.24	2.27	1016	0.800	9.29
3.99	11.03	2.32	1019	0.790	9.33
3.99	11.81	2.78	1309	0.766	10.08
3.99	11.78	2.80	1315	0.763	10.11
3.99	11.69	2.95	1376	0.749	10.29
3.98	11.92	3.11	1480	0.738	10.54

US = 7.916 + 1.897*UP - 0.195*UP**2 KM/SEC.
SIGMA US = 0.12 KM/SEC.

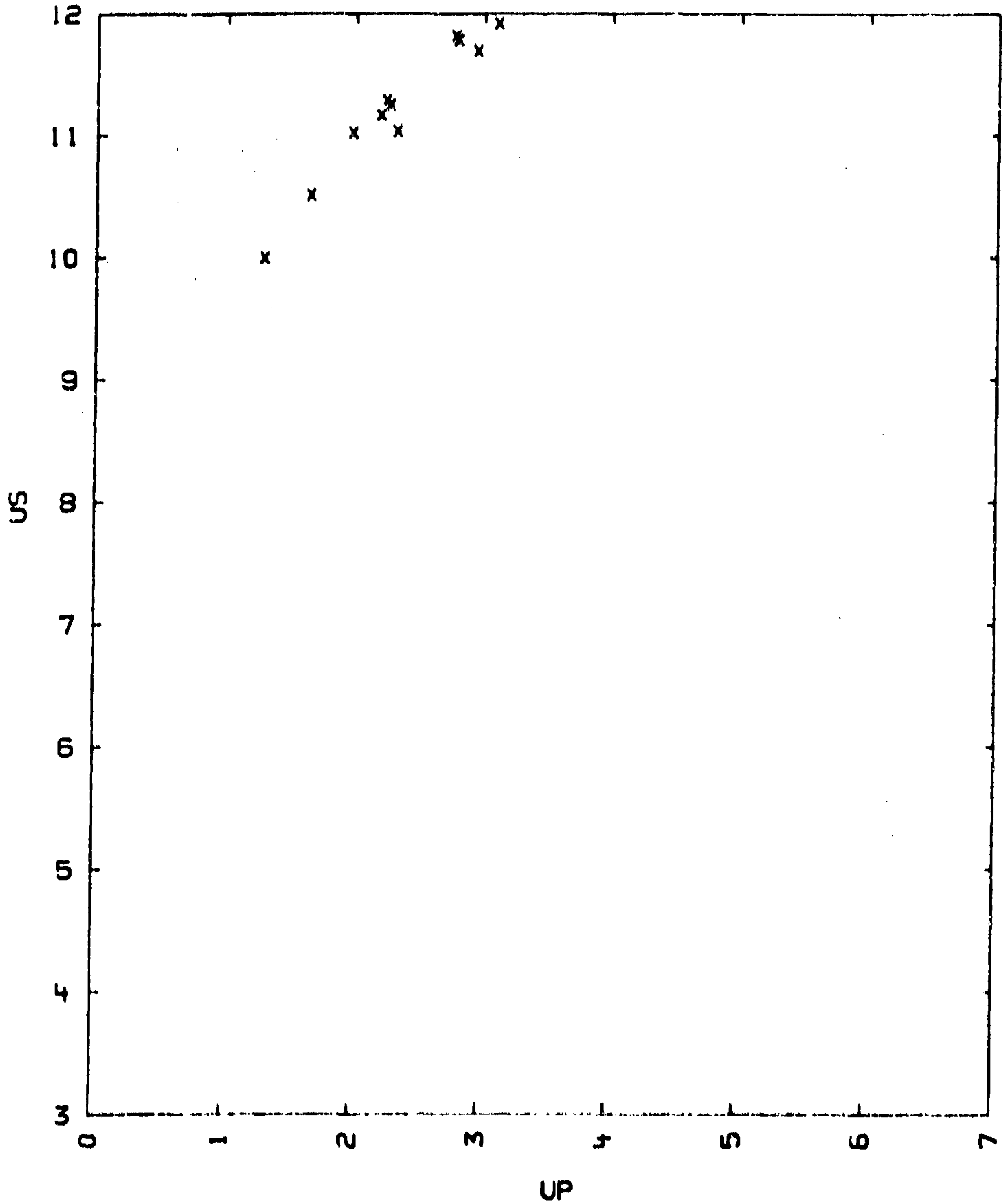
COMMENTS :

1) SOURCE: MCQUEEN R.G. AND MARSH S.P.
PRIVATE COMMUNICATION
LOS ALAMOS SCIENTIFIC LABORATORY, LOS ALAMOS, NEW MEXICO, USA
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION METHOD B STANDARD MATERIAL 2024 ALUMINUM
3) VOI WAS OBTAINED FROM THE LATTICE PARAMETERS LISTED BY WYCKOFF, CRYSTAL STRUCTURES, VOL. 2 (JOHN WILEY AND SONS, NEW YORK 1963)
4) FURTHER WORK IS IN PROGRESS.

TABLE I

CORUNDUM (ALUMINUM OXIDE CRYSTALLINE)

29-1---1



29-1---2
CORUNDUM (ALUMINUM OXIDE CERAMIC)

AL2-03

V0 = 0.2611 CC/G
V01= 0.2515 CC/G

THE TABLE LISTS SHOCK AND PARTICLE VELOCITY IN KM/SEC., PRESSURE IN KBARS AND DENSITY IN G/CC. ST DESIGNATES THE STANDARD SAMPLE HOLDER MATERIAL.

TABLE

RHO0	US	UP	P	V/V0	US(ST)
3.83	8.63	0.94	310	0.891	7.00
3.83	8.68	1.22	405	0.859	7.42
3.83	8.92	1.37	469	0.845	7.67
3.83	9.43	1.76	635	0.813	8.28
3.83	9.62	1.77	653	0.815	8.32
3.83	9.56	1.78	652	0.813	8.32
3.83	10.26	2.21	870	0.783	9.01
3.83	10.27	2.31	909	0.774	9.15
3.83	11.17	2.90	1240	0.741	10.06
3.83	11.25	3.03	1312	0.731	10.25

US = 6.956 + 1.449*UP KM/SEC.
SIGMA US = 0.069 KM/SEC.

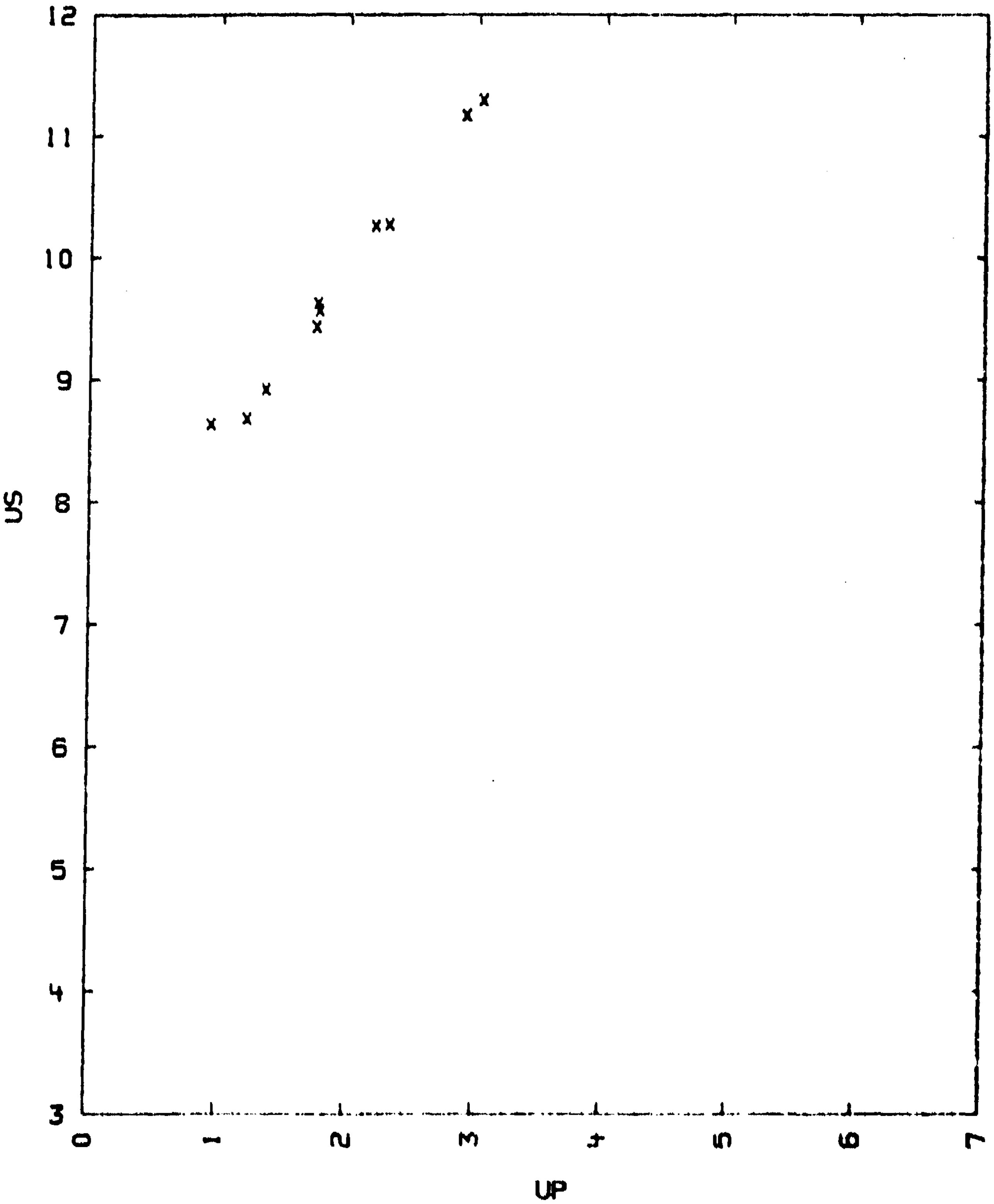
COMMENTS :

1) SOURCE: MCQUEEN R.G. AND MARSH S.P.
PRIVATE COMMUNICATION
LOS ALAMOS SCIENTIFIC LABORATORY, LOS ALAMOS, NEW MEXICO, USA
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION METHOD B STANDARD MATERIAL 2024 ALUMINUM
3) V01 WAS OBTAINED FROM THE LATTICE PARAMETERS LISTED BY WYCKOFF, CRYSTAL STRUCTURES, VOL. 2 (JOHN WILEY AND SONS, NEW YORK 1963)
4) FURTHER WORK IS IN PROGRESS.

TABLE I

CORUNDUM (ALUMINUM OXIDE CERAMIC)

29-1---2



29-1---3
ALUMINUM OXIDE, CERAMIC

WESGO AL-995 (TABLE I):
AL2-O3 99.5 WT. PERCENT MINIMUM
MG-O MAJOR IMPURITY
SI-O2 - -
POROSITY 3.5-4.3 PERCENT MAX

LUCALOX (TABLE II):
AL2-O3 99.8 WT. PERCENT
POROSITY 0.2 PERCENT MAX

V0 = 0.2513-0.2626 CC/G CL = 10.3 KM/SEC C0 = 7.55 KM/SEC
V0I = 0.2515 CC/G CS = 6.12 KM/SEC.

IN THE TABLES BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN KM/SEC., AND PRESSURE IN KILOBARS. BP DENOTES THE BASE PLATE MATERIAL. SUBSCRIPTS 1 AND 2 DENOTE THE ELASTIC WAVE AND THE FIRST SHOCK WAVE RESPECTIVELY.

TABLE I

RHO0	US1	UP1	P1	V1/V0	US2	UP2	P2	V2/V0	BP
3.814	10.07	0.28	100.	0.974	6.75	0.29	107.	0.970*	LU
3.810	10.38	0.21	84.	0.980	7.83	0.31	113.	0.967*	LU
3.814	10.32	0.20	79.	0.981	7.26	0.87	263.	0.893	AL
3.809	9.82	0.18	67.	0.982	7.54	0.85	259.	0.895	AL
3.810	10.07	0.22	85.	0.978	8.62	1.28	432.	0.857	AL
3.809	10.05	0.21	81.	0.979	8.59	1.26	424.	0.858	AL
3.837					11.03	2.677	1131.	0.756	BR
3.839					10.9	2.687	1121.	0.753	BR
3.808					9.08	1.96	736.	0.802	AL

US = 6.43 + 1.70*UP - 0.32*UP**2 KM/SEC SIGMA US = 0.08 KM/SEC

TABLE II

SAMPLE										STANDARD	
RHO0	US1	UP1	P1	V1/V0	US2	UP2	UFS2	P2	V2/V0	BP	UFS
3.98	10.98	0.368	161.	0.9663	8.80	0.477	1.174	199.	0.9544	AL	1.543
-	-	0.262	114.	0.9759	8.79	0.495	0.944	195.	0.9492	-	-
-	10.90	0.284	123.	0.9739	8.53	0.495	0.957	195.	0.9492	-	-
-	10.98	0.253	111.	0.9771	9.60	0.93	1.67	369.	0.9062	-	2.694
-	10.88	0.228	99.	0.9791	9.36	0.96	1.57	366.	0.9003	-	-

US =

COMMENTS:

1) SOURCE: AHRENS T.J., GUST W.H. AND ROYCE E.B.

J. APPL. PHYS., VOL. 39, P. 4610, (1968)

2) EXPERIMENTAL TECHNIQUE C) WAS USED FOR ALL ENTRIES EXCEPT FOR THE LAST ENTRY OF TABLE I, WHICH WAS OBTAINED WITH TECHNIQUE B

DATA REDUCTION TECHNIQUE D UFS=2*UP, TABLE I, FIRST 6 ENTRIES
B TABLE I, LAST 3 ENTRIES AND TABLE II

BASE PLATE MATERIALS: LUCITE(LU), 2024 ALUMINUM(AL) AND LOW LEAD BRASS (BR)

3) SAMPLE MATERIALS: WESGO AL-995,TABLEI (WESTERN GOLD AND PLATINUM CO. BELMOND, CALIF., USA.)
LUCALOX, TABLE II (GENERAL ELECTRIC CO., OHIO)

4) CL AND CS ABOVE ARE FOR WESGO AL-995 (H. DUNEGAN, PRIVATE COMMUNICATION. (1966)

CL = 10.845 KM/SEC FOR LUCALOX (E. SCHREIBER AND O. L. ANDERSON, J. AM. CER SOC., VOL. 49, P. 184, (1966)

5) VOI WAS OBTAINED FROM THE LATTICE PARAMETERS LISTED BY WYCKOFF, CRYSTAL STRUCTURES, VOL. 2 (JOHN WILEY AND SONS, NEW YORK, N. Y., USA, 1963).

6) THE DATA OF TABLE II WHICH WERE TAKEN WITH 3.2 TO 12.7 MM. THICK SAMPLES INDICATE 4 TO 5 KBAR DECAY OF SHOCK STRENGTH OVER THAT THICKNESS RANGE.

7) * INDICATES LESS RELIABLE DATA ON THE SECOND WAVE WHICH WERE NOT USED IN FIT.

TABLE I

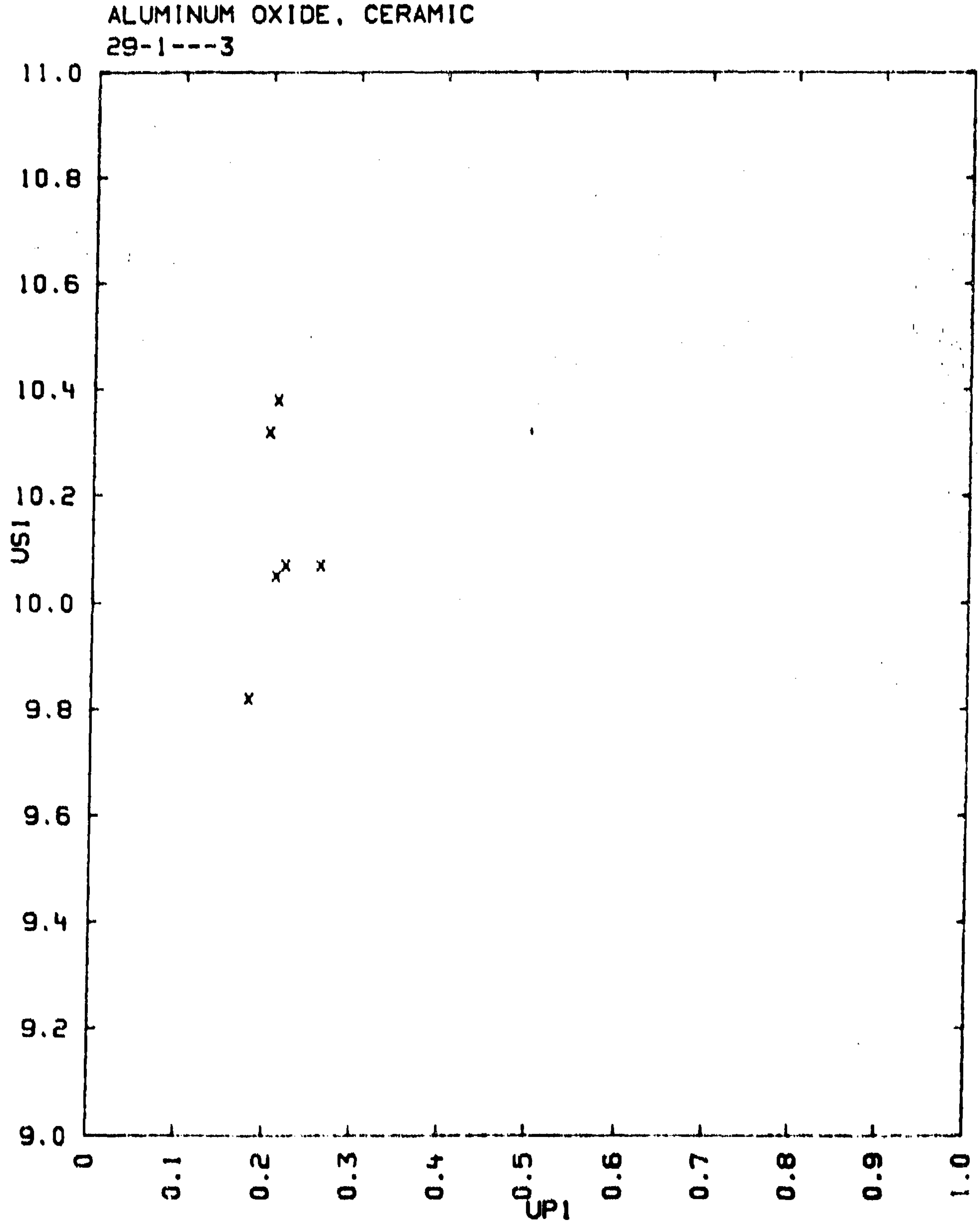

ALUMINUM OXIDE, CERAMIC
29-1---3
11.0
10.8
10.6
10.4
10.2
10.0
9.8
9.6
9.4
9.2
9.0
USI
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
UP1

TABLE 1

ALUMINUM OXIDE, CERAMIC
29-1---3

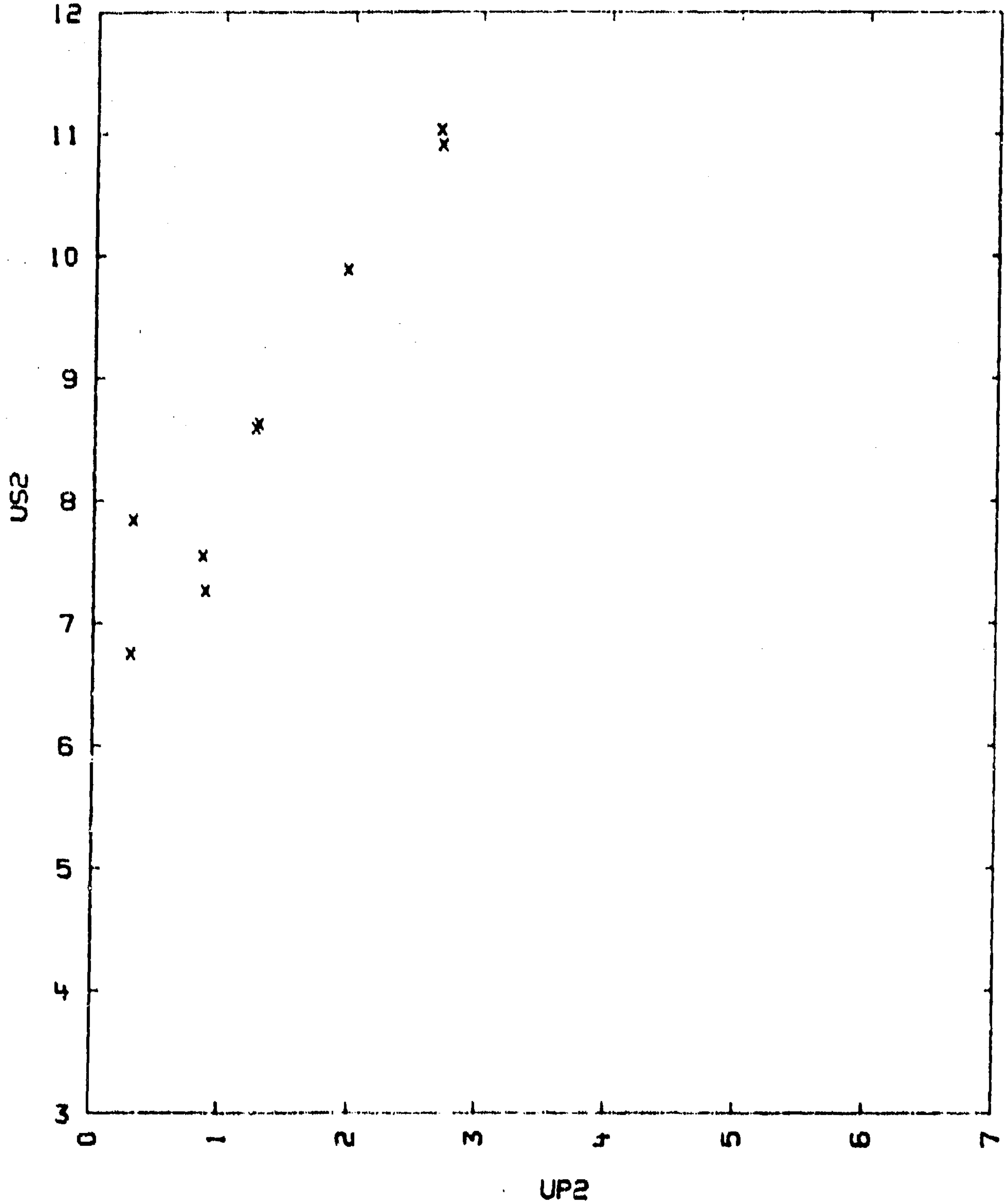


TABLE II

ALUMINUM OXIDE, CERAMIC
29-1---3

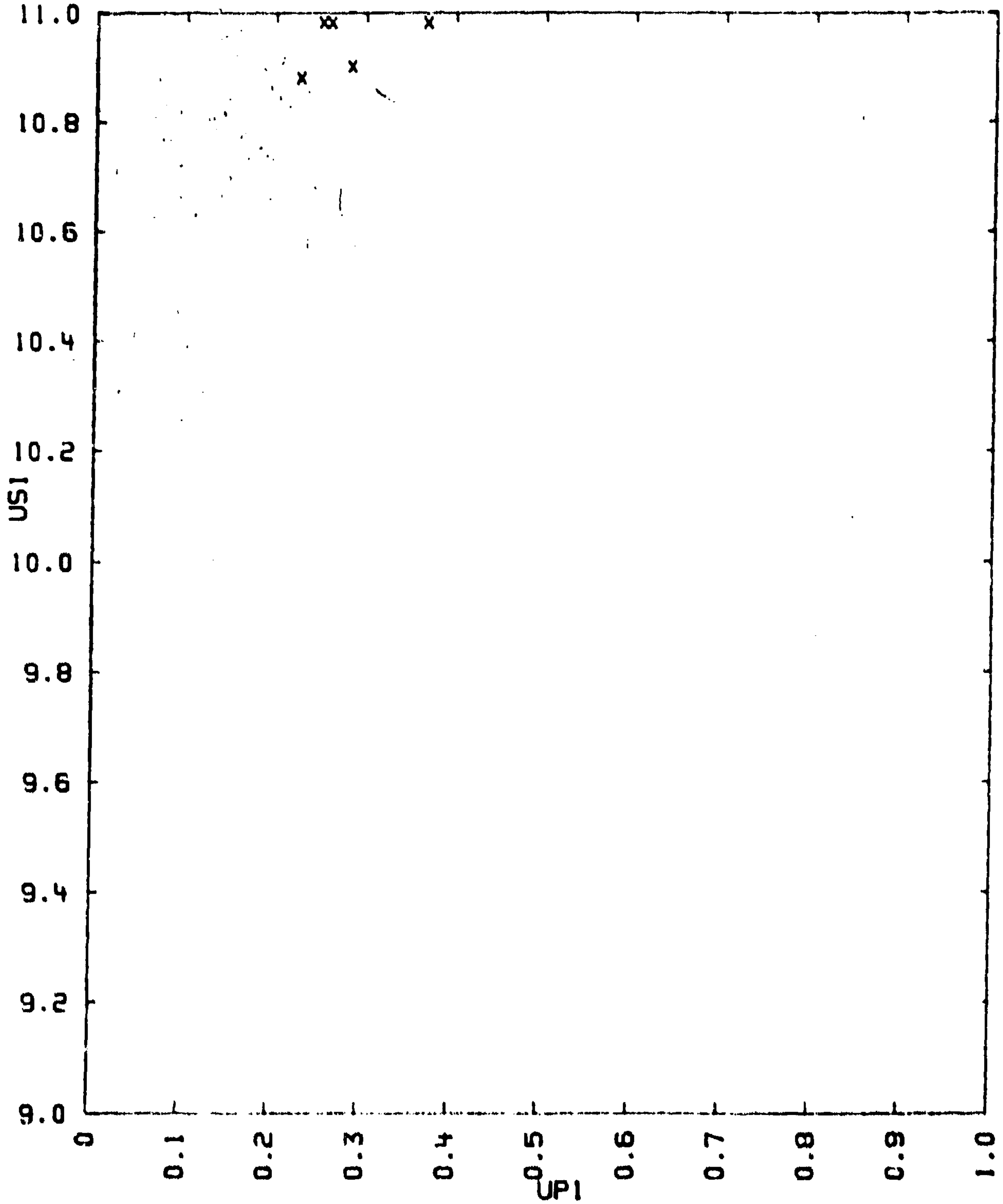
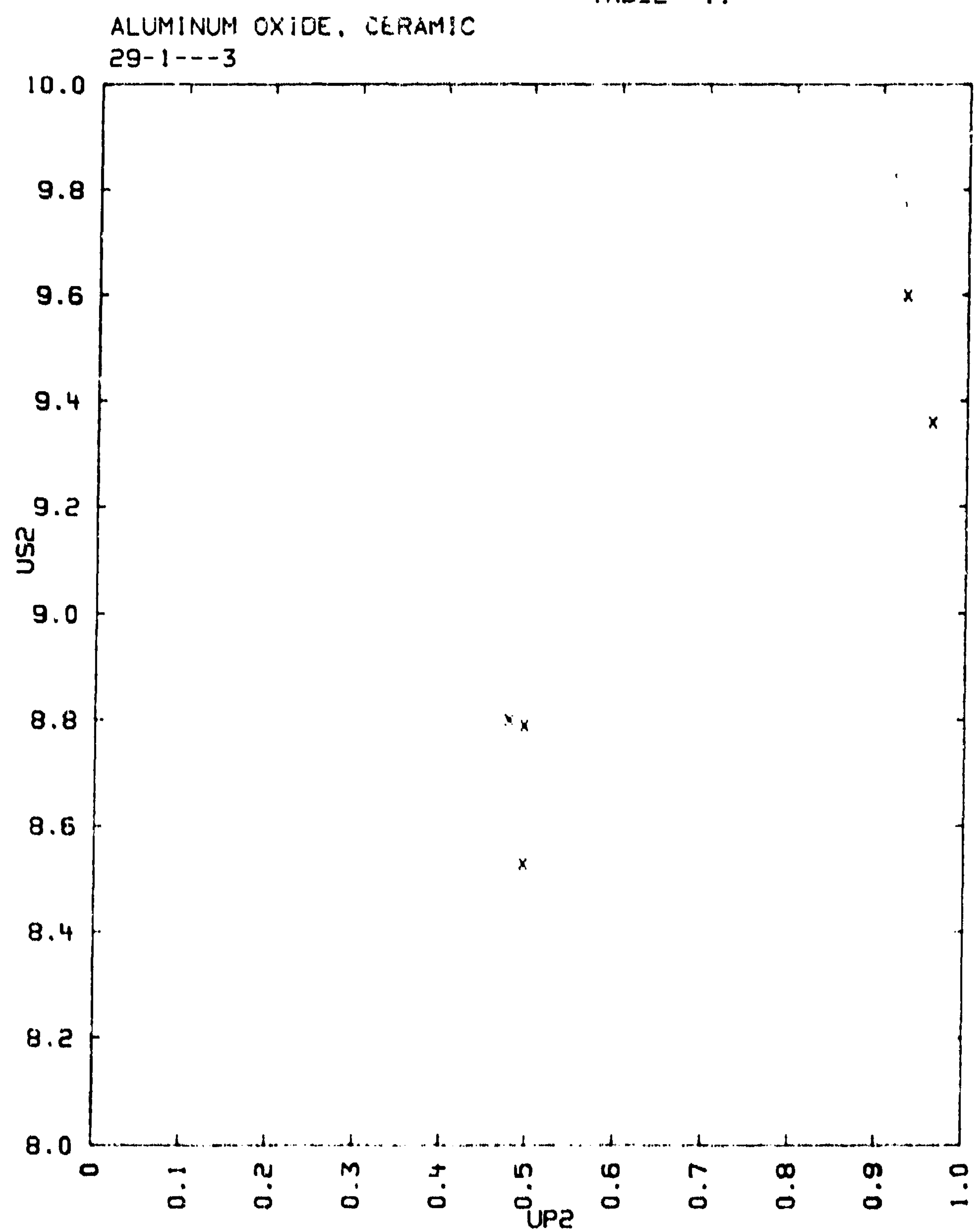


TABLE II



ALUMINUM OXIDE, CERAMIC
29-1---3
10.0
9.8
9.6
9.4
9.2
9.0
8.8
8.6
8.4
8.2
8.0
US2
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
UP2

29-24-1---1
ANDALUSITE NATURAL (ALUMINUM SILICATE)

AL2-SI-05

V0 = 0.325 CC/G
V0I = 0.318 CC/G

THE TABLE LISTS SHOCK AND PARTICLE VELOCITY IN KM/SEC., PRESSURE IN KBARS AND DENSITY IN G/CC. ST DESIGNATES THE SAMPLE HOLDER AND STANDARD MATERIAL.

TABLE

RHO0	US	UP	P	V/V0	US(ST)
3.08	7.74	2.49	594	0.678	8.68
3.06	7.91	2.53	613	0.688	8.75
3.10	7.94	2.67	657	0.694	8.93
3.07	7.94	2.76	673	0.687	9.02
3.06	7.94	2.68	701	0.683	9.16
3.09	8.32	2.97	763	0.690	9.33
3.06	8.84	3.20	867	0.683	9.67
3.08	9.20	3.50	993	0.685	10.08
3.07	9.36	3.63	1042	0.568	10.25
3.06	9.39	3.65	1049	0.567	10.27
3.09	9.52	3.70	1089	0.572	10.37
3.09	9.87	3.80	1158	0.572	10.54

US = 2.869 + 1.811*UP KM/SEC.
SIGMA US = 0.12 KM/SEC.

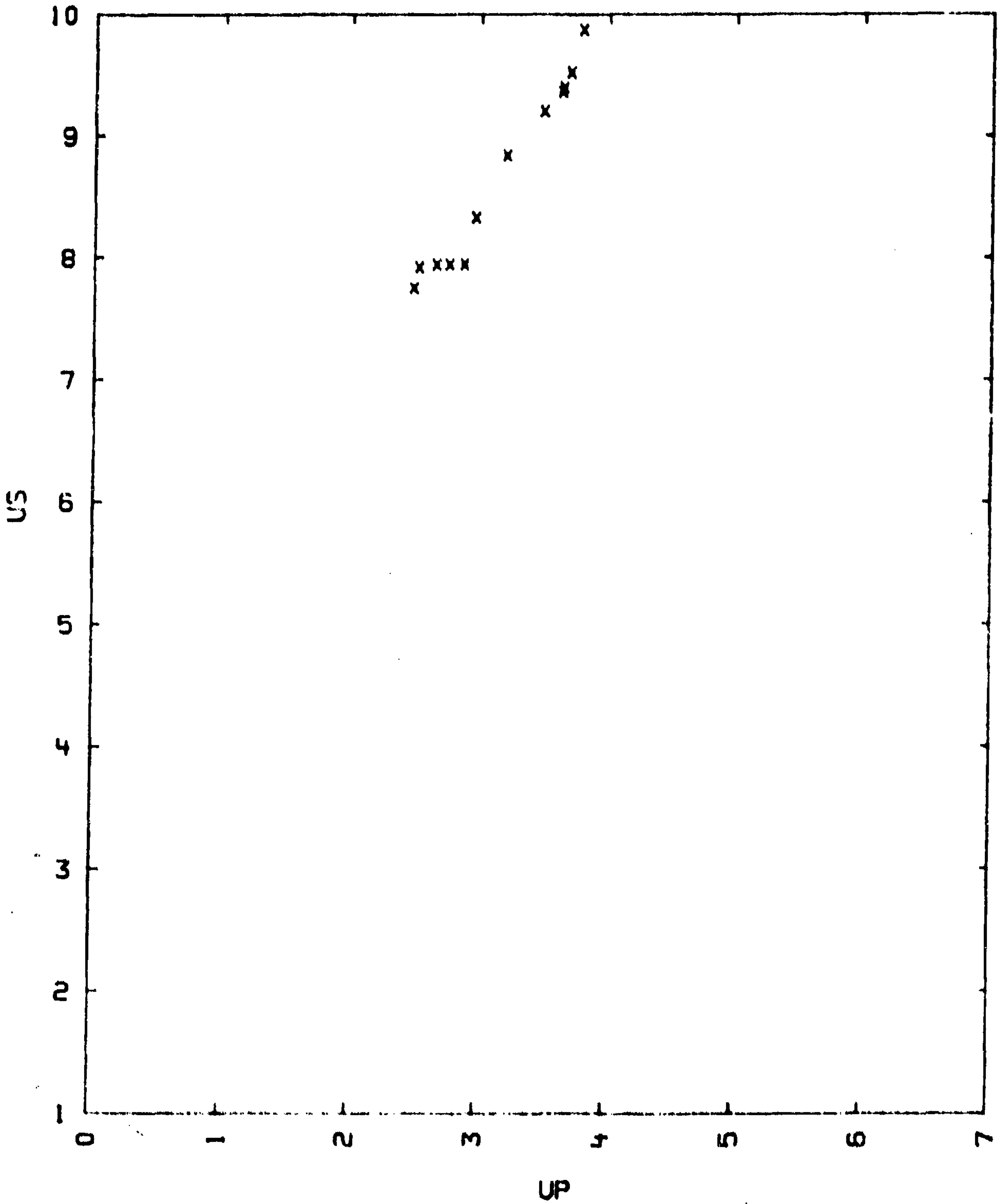
COMMENTS :

1) SOURCE: MCQUEEN R.G. AND MARSH S.P.
PRIVATE COMMUNICATION
LOS ALAMOS SCIENTIFIC LABORATORY, LOS ALAMOS, NEW MEXICO, USA
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION METHOD B STANDARD MATERIAL 2024 ALUMINUM
3) V0I WAS OBTAINED FROM THE LATTICE PARAMETERS LISTED IN CRYSTAL DATA DETERMINATIVE TABLES (AMERICAN CRYST. ASSN. MONOGRAPH 5, 1963) 2ND ED
4) FURTHER WORK IN PROGRESS

TABLE I

ANDALUSITE NATURAL (ALUMINUM SILICATE)

29-24-1---1



29-24-1---2
SILLIMANITE (ALUMINUM SILICATE)

AL2-SI-05

V0 = 0.319 CC/G
V01= 0.3080 CC/G

THE TABLE LISTS SHOCK AND PARTICLE VELOCITY IN KM/SEC., PRESSURE IN KBARS AND DENSITY IN G/CC. ST DESIGNATES THE SAMPLE HOLDER AND STANDARD MATERIAL.

TABLE

RHOO	US	UP	P	V/VO	US(ST)
3.07	7.54	2.52	584	0.666	8.68
3.12	7.83	2.52	616	0.678	8.75
3.13	8.01	2.65	664	0.670	8.93
3.13	8.05	2.70	680	0.665	9.00
3.10	7.94	2.75	676	0.654	9.02
3.09	8.15	2.84	715	0.652	9.16
3.13	8.48	2.93	778	0.655	9.33
3.13	8.89	3.16	881	0.644	9.67
3.15	9.29	3.45	1012	0.627	10.08
3.13	9.42	3.59	1060	0.619	10.25
3.13	9.55	3.68	1099	0.615	10.37

US = 3.58 + 1.64*UP KM/SEC.
SIGMA US = 0.11 KM/SEC.

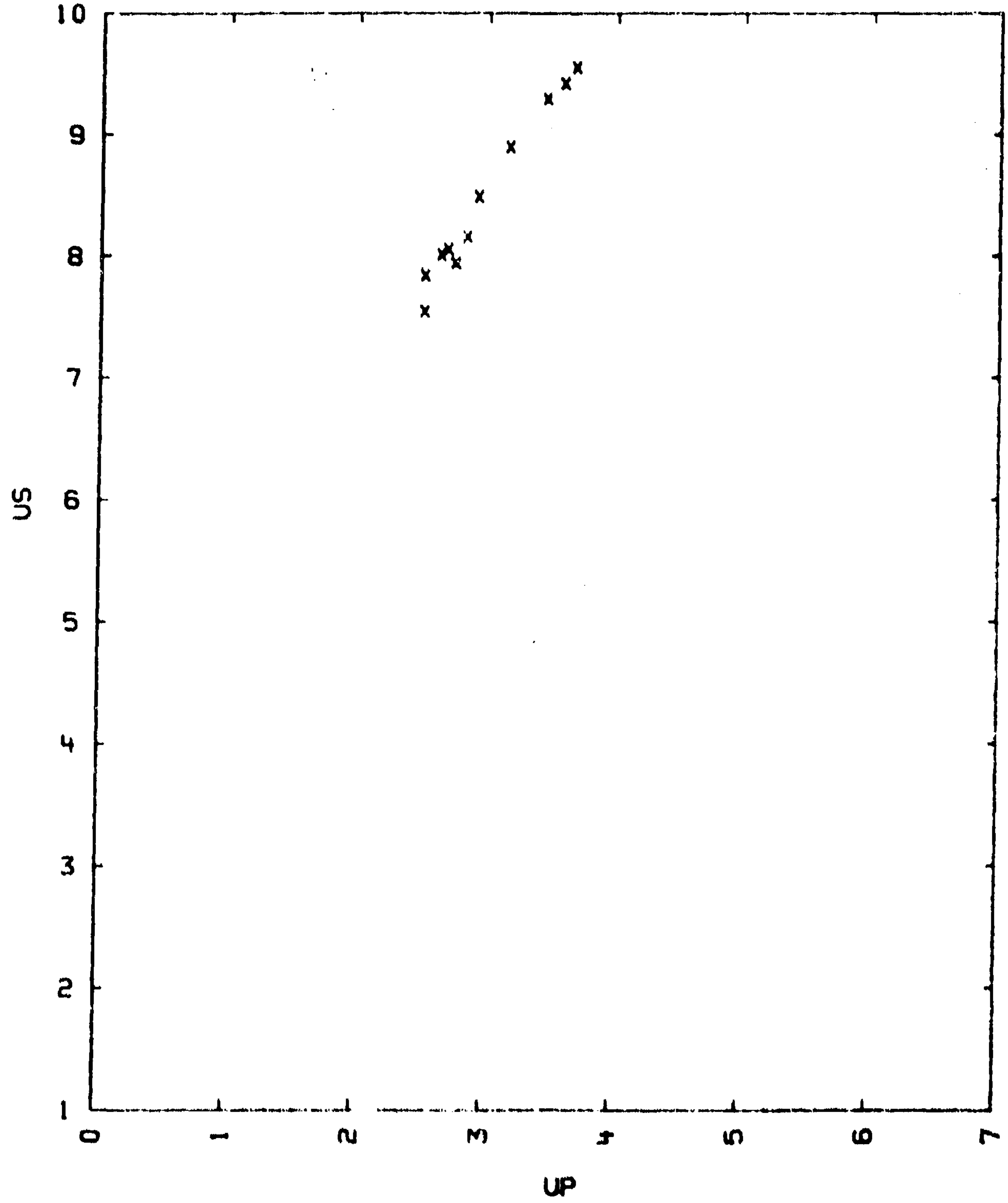
COMMENTS :

1) SOURC : MCQUEEN R.G. AND MARSH S.P.
PRIVATE COMMUNICATION
LOS ALAMOS SCIENTIFIC LABORATORY, LOS ALAMOS, NEW MEXICO, USA
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION METHOD B STANDARD MATERIAL 2024 ALUMINUM
3) V01 WAS OBTAINED FROM THE DENSITY LISTED IN THE HANDBOOK OF CHEM. AND PHYS. (THE CHEMICAL RUBBER CO., CLEVELAND 1964-1965) 45TH ED.
4) FURTHER WORK IN PROGRESS

TABLE I

SILLIMANITE (ALUMINUM SILICATE)

29-24-1---2



33-27-1---1
LEAD ZIRCONATE

PB-ZR-O3 WITH NB AND TI DOPING :

LEAD	PB	0.987	MOLE	PER	3	MOLE	OXYGEN
ZIRCONIUM	ZR	0.927	-	-	-	-	-
NIOBIUM	NB	0.025	-	-	-	-	-
TITANIUM	TI	0.048	-	-	-	-	-

VO = 0.127-0.130 CC/G   CL = 3.93-4.27 KM/SEC
VOI = 0.1225 CC/G

THE TABLES LIST DENSITY IN G/CC, VELOCITIES IN KM/SEC AND PRESSURE IN KILOBARS. D = THICKNESS IN MM. EM = EXPERIMENTAL METHOD. MAT = MATERIAL.

TABLE I

EXPNO	D	US1	UP1	US2	UP2	EM
8413	12.5	4.14	0.123	3.5	0.235	C2
8445	8.7	4.28	0.127			C2
8662	12.5			4.15	0.448	C2
8468	5.3			4.24	0.435	C2
8703	5.1	4.36	0.125	4.04	0.323	C2
8705	6.5*	4.26	0.145	4.00	0.355	D
8748	5.4	4.22	0.0073	3.55	0.042	D
8883	3.6	4.26	0.0062	3.62	0.072	D
-	4.5	4.15	0.0046	3.59	0.0725	D
8884	5.4	4.26	0.0060			D
8903	3.4	3.9	0.010			D

US = 3.12 + 8.2*UP KM/SEC   FOR UP FROM 0.04 TO 0.13 KM/SEC
US = 2.38 + 4.8*UP KM/ESC   FOR UP FROM 0.22 TO 0.45 KM/SEC

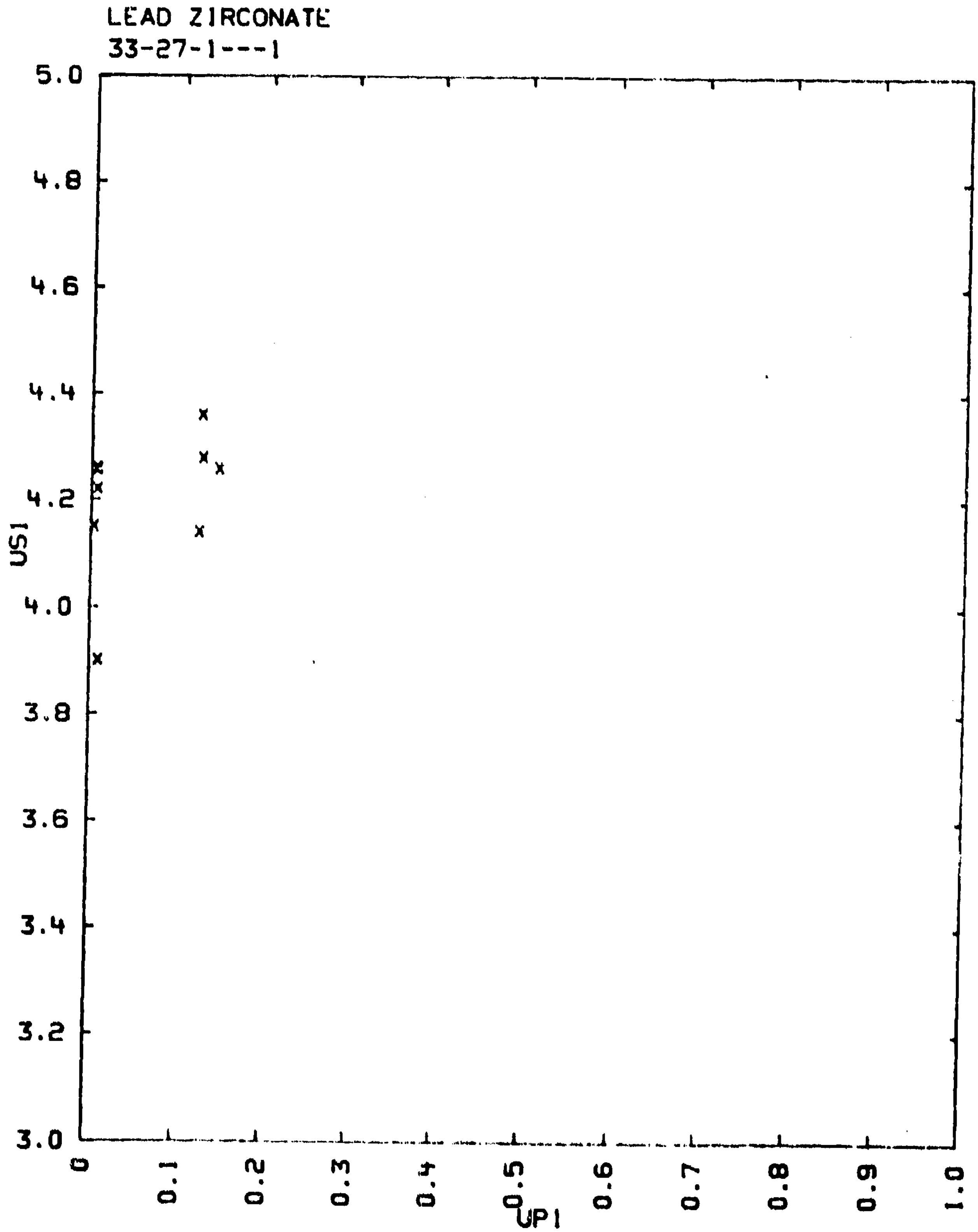
TABLE II

SAMPLE						STANDARD	
EXPNO	RHOO	P1	V1/VO	P2	V2/VO	P	MAT
8413	7.81	4'	0.970	70	0.938	65	BRASS
8445	7.82	41	0.970			7.9	IRON
8662	7.68			142	0.8925	156	AL
8468	7.73			142	0.8973	150	BRASS
8703	7.89	43	0.9713	106	0.9222	117	LUCITE
8705	7.89	48	0.9657	115	0.9130		LUCITE
8748	7.80	12.4	0.9983	12.1	0989	18	STEEL
8883	7.80	2.04	0.9986	21.1	0.9811	19	STEEL
-	7.74	1.5	0.9989	20.8	0.9803	21	STEEL
8884	7.00	2.0	0.9986			2.5	LUCITE
8903	7.80	3.1	0.9975			5.6	AL

COMMENTS:

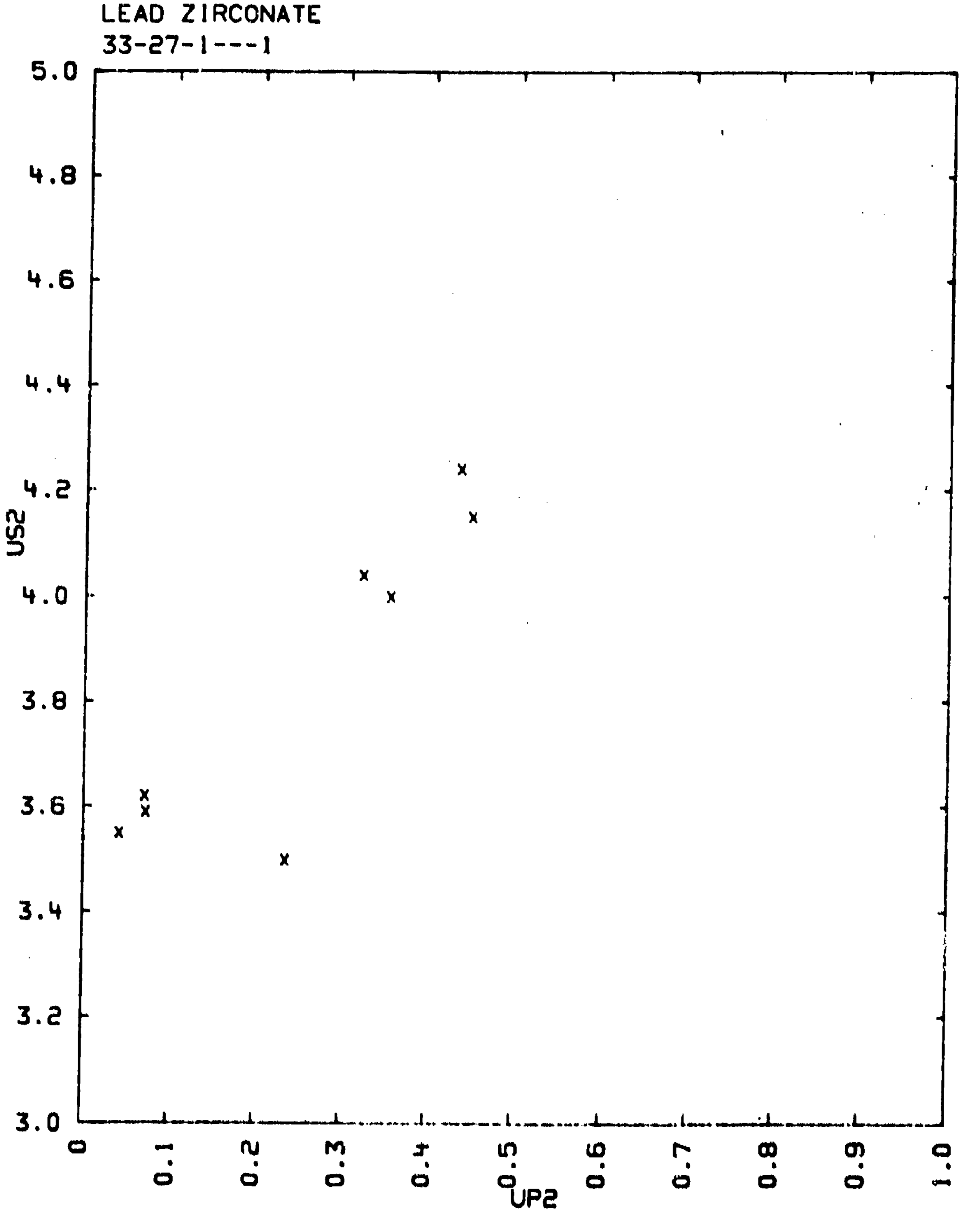
1) SOURCE: DORAN, D. G.
REPORT NO SC-DC-64-348 (1962)
STANFORD RES. INST., MENLO PARK, CALIF.
2) EXPERIMENTAL TECHNIQUE C2 AND D
DATA REDUCTION METHOD D WITH 2UP = UFS.
3) THE DATA SHOW A DECREASE OF US WITH PRESSURE BETWEEN 2 AND 5 KBAR.
THIS WAS NOT OBSERVED BY REYNOLDS AND SEAY, J. APPL. PHYS., VOL. 33,
P. 2234 (1962) :
THEY GIVE A FIT FOR AN ELASTIC WAVE AND A PLASTIC WAVE
US1 = 2.99 + 19.2*UP1 KM/SEC UP1MAX = 0.060- US1MAX = 4.15 KM/SEC
SIG UP1 = 0.004- SIG US1 = 0.05 KM/SEC
US2 = 1.63 + 3.53*UP2 KM/SEC FOR UP2 BETWEEN 0.06 AND 1.1 KM/SEC
WITH 2UP=UFS
FOR A ZIRCONATE-TITANATE OF COMPOSITION. PB-ZR0.52-TI0.48-O3
WITH V0 = 0.132 CC/G.
4) THE CURIE TEMPERATURE OF THE ZIRCONATE IS 215 DEG. C.
5) DENSITY UNIFORMITY OF THE SAMPLES WAS 0.08 G/CC MAXIMUM.
6) FOR THE EXPERIMENT NO. 8705 THE TABLE LISTS A THICKNESS OF SAMPLE
WHICH IS THE MAXIMUM THICKNESS OF A 9 DEG. WEDGE.

TABLE I



LEAD ZIRCONATE
33-27-1---1
5.0
4.8
4.6
4.4
4.2
4.0
3.8
3.6
3.4
3.2
3.0
US1
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
UP1

TABLE I


LEAD ZIRCONATE
33-27-1---1
US2
UP2
5.0
4.8
4.6
4.4
4.2
4.0
3.8
3.6
3.4
3.2
3.0
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0

41-1---1
HEMATITE NATURAL (FERRIC OXIDE)

FE2-03

VO = 0.204 TO 0.198 CC/G
VOI= 0.1893 CC/G

THE TABLE LISTS SHOCK AND PARTICLE VELOCITY IN KM/SEC., PRESSURE IN KBARS AND DENSITY IN G/CC. ST DESIGNATES THE STANDARD SAMPLE HOLDER MATERIAL.

TABLE

RHOO	US	UP	P	V/VO	US(ST)
5.01	7.62	2.34	898	0.692	9.15
4.90	7.67	2.39	900	0.687	9.18
4.98	7.77	2.44	944	0.687	9.29
5.01	7.86	2.45	964	0.688	9.33
5.01	8.49	2.92	1243	0.657	10.08
5.02	8.47	2.92	1243	0.654	10.08
5.01	8.47	2.93	1241	0.654	10.08
5.05	8.48	2.93	1255	0.655	10.11
5.05	8.45	2.93	1253	0.652	10.11
4.97	8.84	3.23	1421	0.634	10.54

US = 4.385 + 1.393*UP KM/SEC.
SIGMA US = 0.037 KM/SEC.

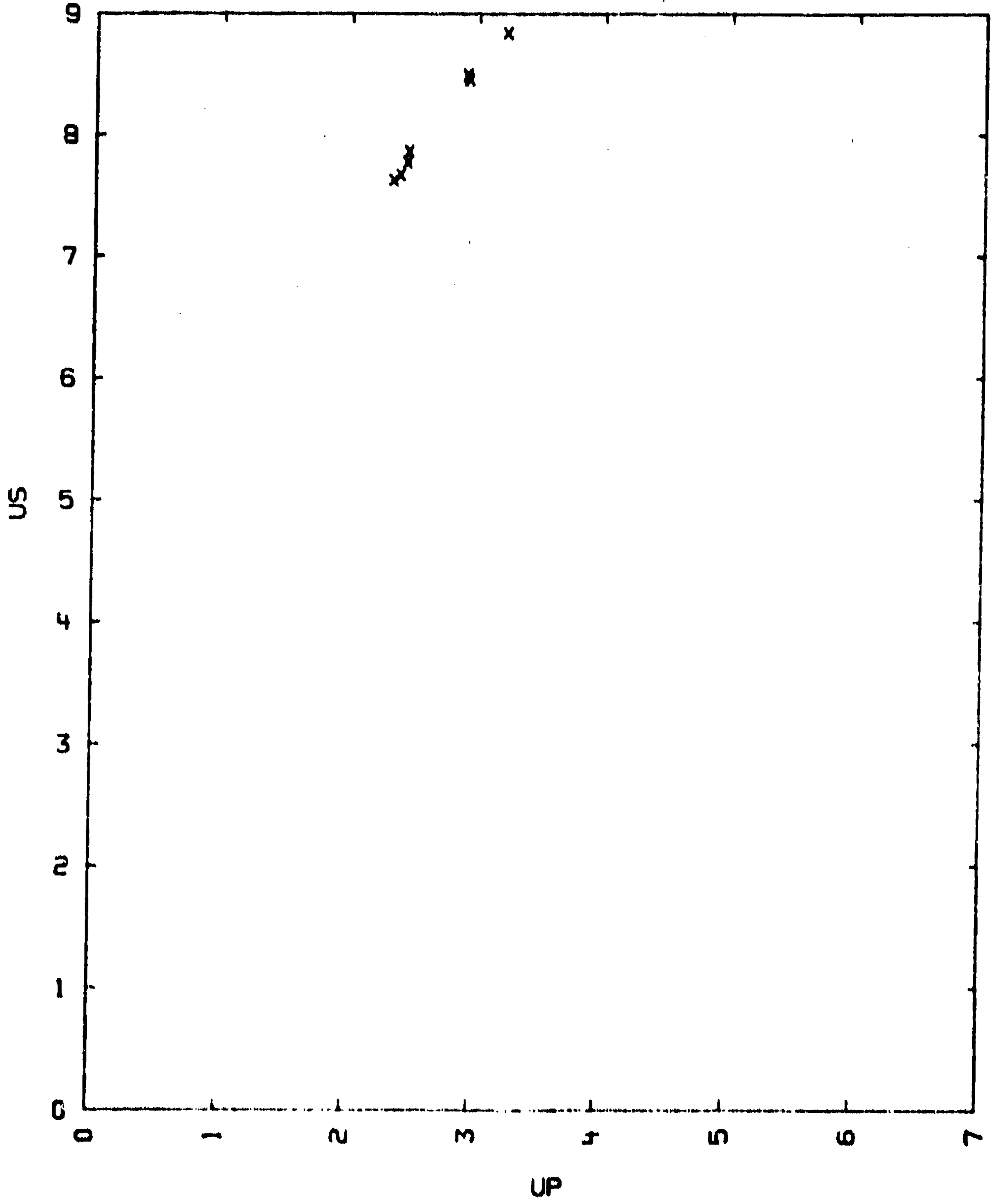
COMMENTS :

1) SOURCE: MCQUEEN R.G. AND MARSH S.P.
PRIVATE COMMUNICATION
LOS ALAMOS SCIENTIFIC LABORATORY, LOS ALAMOS, NEW MEXICO, USA
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION METHOD B STANDARD MATERIAL 2024 ALUMINUM
3) VOI WAS OBTAINED FROM THE LATTICE PARAMETERS LISTED BY WYCKOFF
CRYSTAL STRUCTURES, VOL. 2 (JOHN WILEY AND SONS, NEW YORK 1963)
4) FURTHER WORK IS IN PROGRESS.

TABLE I

HEMATITE NATURAL (FERRIC OXIDE)

41-1---1



41-1- -2
MAGNETITE NATURAL (FERROSOFERRIC OXIDE)

FE3-04

V0 = 0.200 TO 0.194 CC/G
V0I= 0.1924 CC/G

THE TABLE LISTS SHOCK AND PARTICLE VELOCITY IN KM/SEC., PRESSURE IN KBARS AND DENSITY IN G/CC. ST DESIGNATES THE STANDARD SAMPLE HOLDER MATERIAL.

TABLE

RHOO	US	UP	P	V/VO	US(ST)
5.11	6.72	1.80	620	0.731	8.28
5.14	6.82	1.82	637	0.734	8.32
5.13	6.77	1.83	634	0.731	8.32
5.14	6.74	1.83	634	0.728	8.32
5.13	7.23	2.08	771	0.713	8.75
5.11	7.40	2.26	853	0.695	9.01
5.13	7.19	2.29	845	0.682	9.02
5.13	7.43	2.35	894	0.685	9.15
5.11	7.53	2.45	942	0.675	9.29
5.13	7.92	2.67	1083	0.664	9.67
5.14	8.26	2.93	1241	0.646	10.08
5.01	8.37	2.93	1227	0.651	10.06
5.10	8.25	2.94	1235	0.645	10.08
5.13	8.27	2.94	1248	0.645	10.11
5.13	8.45	3.03	1310	0.642	10.25

US = 4.259 + 1.368*UP KM/SEC.
SIGMA US = 0.082 KM/SEC.

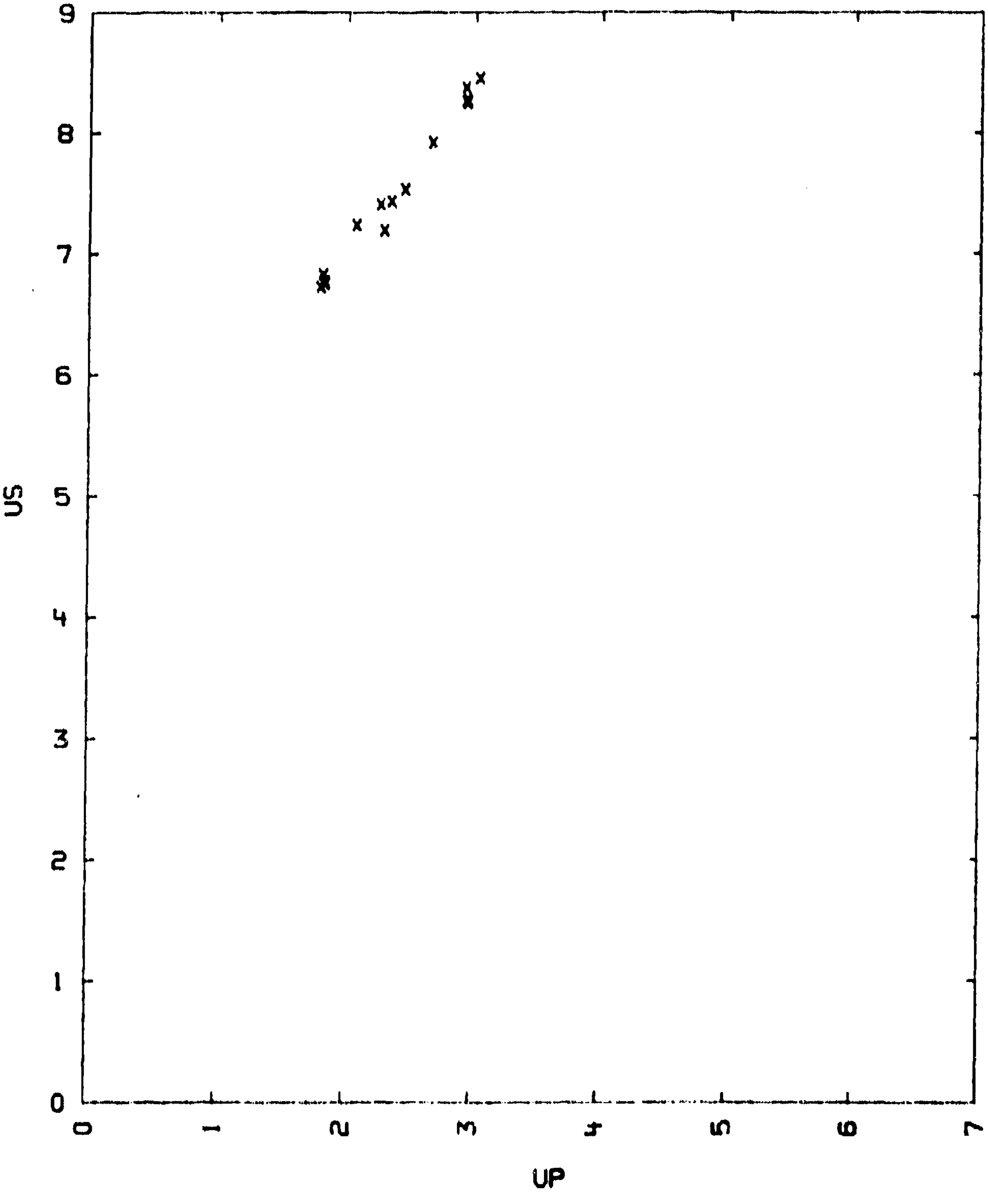
COMMENTS :

1) SOURCE: MCQUEEN R.G. AND MARSH S.P.
PRIVATE COMMUNICATION
LOS ALAMOS SCIENTIFIC LABORATORY, LOS ALAMOS, NEW MEXICO, USA
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION METHOD B STANDARD MATERIAL 2024 ALUMINUM
3) VOI WAS OBTAINED FROM THE LATTICE PARAMETERS LISTED BY WYCKOF
CRYSTAL STRUCTURES VOL. 2 (JOHN WILEY AND SONS, NEW-YORK 1963)
4) FURTHER WORK IS IN PROGRESS.

TABLE I

MAGNETITE NATURAL (FERROSOFERRIC OXIDE)

41-1---2



41-24-1---1
FAYALITE (IRON ORTHOSILICATE)

FE2-SI-O4

V0 = 0.232 TO 0.239 CC/G
V01= 0.2314 CC/G

THE TABLE LISTS SHOCK AND PARTICLE VELOCITY IN KM/SEC., PRESSURE IN KBARS AND DENSITY IN G/CC. ST DESIGNATES THE STANDARD SAMPLE HOLDER MATERIAL.

TABLE

RHO0	US	UP	P	V/V0	US(ST)
4.30	6.65	2.02	577	0.697	8.33
4.29	7.06	2.30	696	0.675	8.76
4.23	7.23	2.37	725	0.671	8.86
4.18	7.56	2.65	839	0.648	9.26
4.29	7.96	2.96	1013	0.627	9.75
4.28	8.32	3.19	1137	0.617	10.10

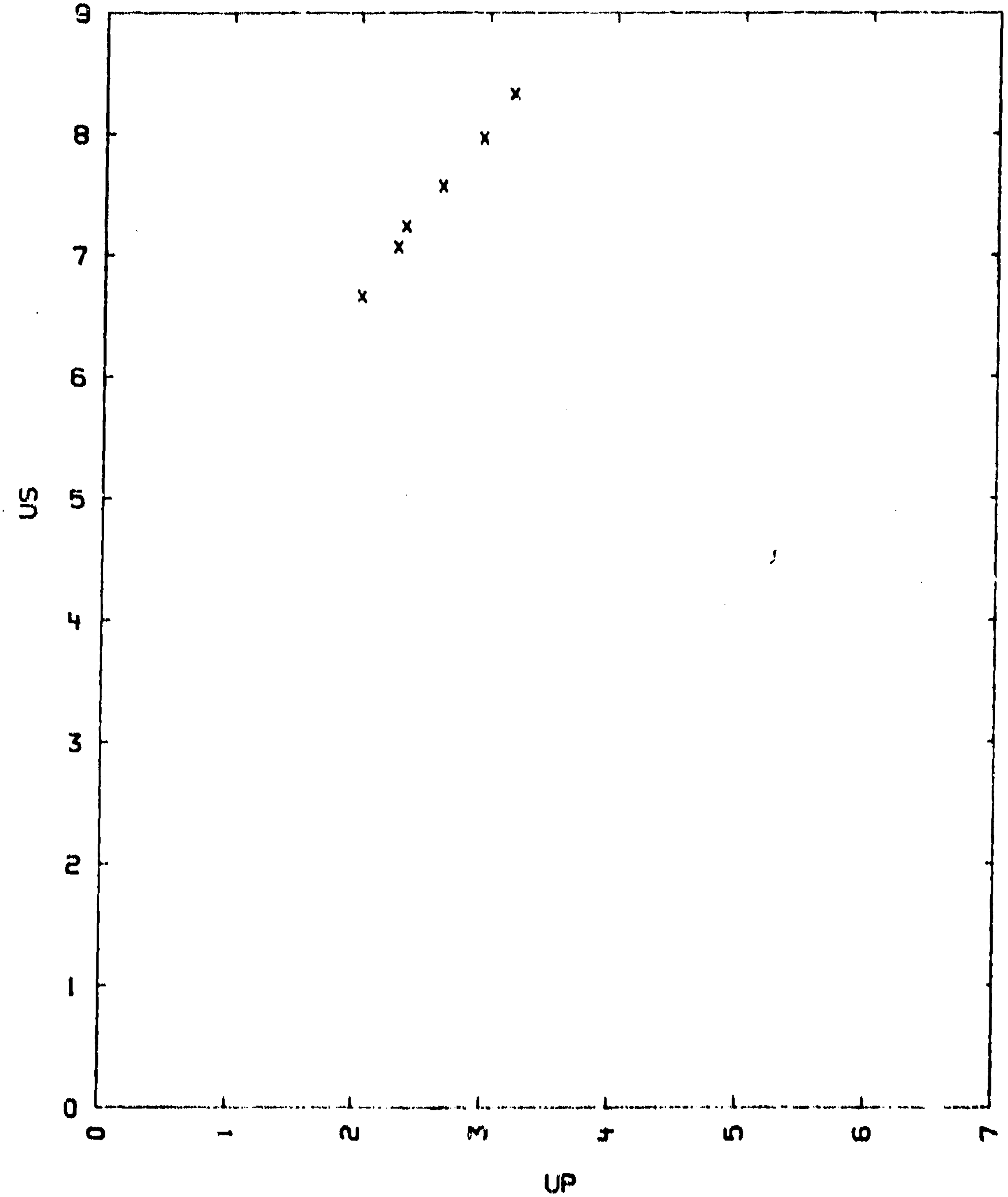
US = 3.862 + 1.395*UP KM/SEC.
SIGMA US = 0.038

COMMENTS :

1) SOURCE: MCQUEEN R.G. AND MARSH S.P.
PRIVATE COMMUNICATION
LOS ALAMOS SCIENTIFIC LABORATORY, LOS ALAMOS, NEW MEXICO, USA
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION METHOD B STANDARD MATERIAL 2024 ALUMINUM
3) V01 WAS OBTAINED FROM THE LATTICE PARAMETERS LISTED IN CRYSTAL DATA DETERMINATIVE TABLES (AM. CRYST. ASSN 1963) 2ND ED.
4) FURTHER WORK IS IN PROGRESS.

TABLE 1

FAYALITE (IRON ORTHOSILICATE)
41-24-1---1



48-1---1
PYROLUSITE (MANGANESE DIOXIDE)

MN-02

V0 = 0.226 TO 0.248 CC/G
V0I= 0.1922 CC/G

THE TABLE LISTS SHOCK AND PARTICLE VELOCITY IN KM/SEC., PRESSURE IN KBARS AND DENSITY IN G/CC. ST DESIGNATES THE SAMPLE HOLDER AND STANDARD MATERIAL.

TABLE

RHO0	US	UP	P	V/V0	US(ST)
4.42	5.11	0.81	183	0.842	6.56
4.39	5.49	1.12	270	0.797	7.01
4.06	5.20	1.41	298	0.729	7.28
4.37	5.91	1.48	381	0.750	7.54
4.33	6.00	1.48	385	0.753	7.55
4.24	5.82	1.57	388	0.730	7.62
4.19	5.83	1.64	402	0.717	7.70
4.24	6.10	1.70	439	0.722	7.82
4.37	6.85	1.98	591	0.712	8.33
4.30	7.08	2.23	681	0.685	8.68
4.36	7.26	2.25	713	0.690	8.76
4.32	7.49	2.31	747	0.691	8.86
4.26	7.39	2.45	771	0.669	9.00
4.36	7.98	2.94	1023	0.632	9.75
4.34	8.37	3.16	1149	0.623	10.10
4.29	8.90	3.31	1263	0.628	10.37
4.31	8.40	3.32	1202	0.604	10.29

US = 3.632 + 1.520*UP KM/SEC.
SIGMA US = 0.25 KM/SEC.

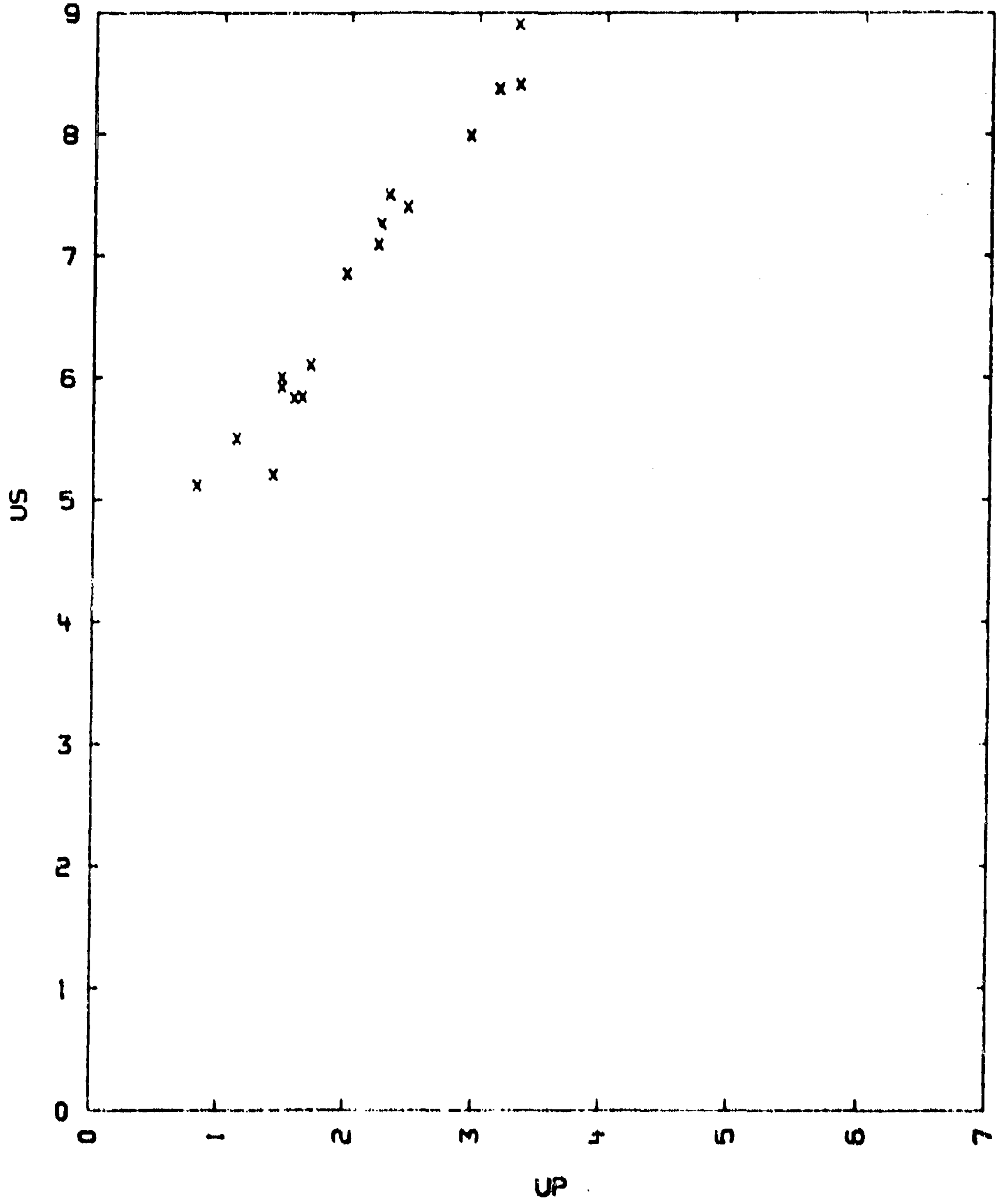
COMMENTS :

1) SOURCE: MCQUEEN R.G. AND MARSH S.P.
PRIVATE COMMUNICATION
LOS ALAMOS SCIENTIFIC LABORATORY, LOS ALAMOS, NEW MEXICO, USA
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION METHOD B STANDARD MATERIAL 2024 ALUMINUM
3) V0I WAS OBTAINED FROM THE LATTICE PARAMETERS LISTED BY WYCKOFF
CRYSTAL STRUCTURES, VOL. 1 (JOHN WILEY AND SONS, NEW-YORK 1963)
4) FURTHER WORK IN PROGRESS

TABLE I

PYROLUSITE (MANGANESE DIOXIDE)

48-1---1



53-23---1
TUNGSTEN CARBIDE

W-C

V0 = 0.06653-0.06671 CC/G   CL = 6.89 KM/SEC   C0 = 4.92 KM/SEC
V01 = 0.06381 CC/G   CS = 4.18 KM/SEC

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN KM/SEC, PRESSURE IN KILOBARS AND DENSITY IN G/CC.

TABLE

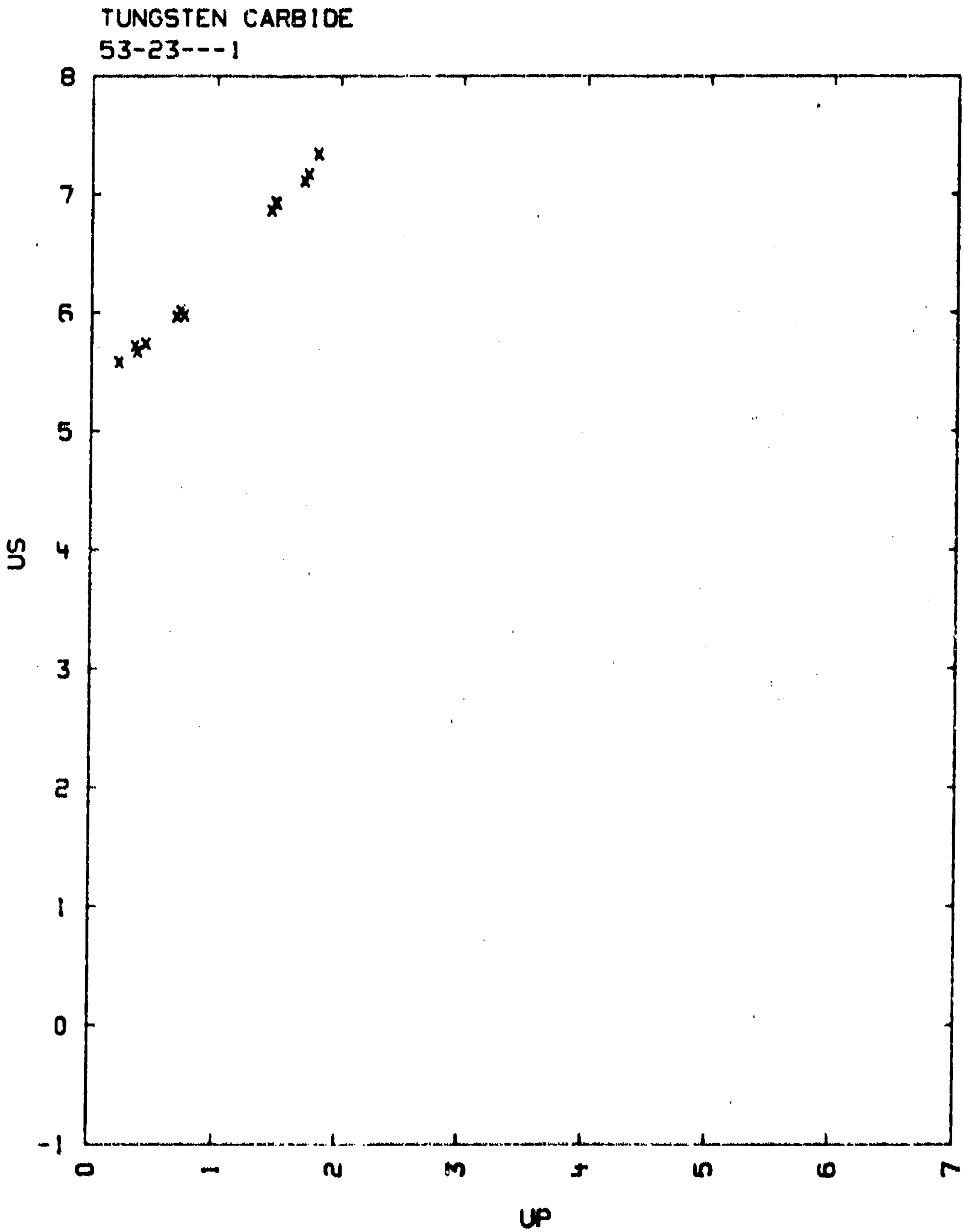
----------------SAMPLE				----------------	-----STANDARD-----	
RHOO	US	UP	P	V/VO	MATERIAL	US(ST)
15.050	5.57	0.22	184.	0.9605	CU	4.44
15.010	5.71	0.35	300.	0.9387	CU	4.71
15.010	5.67	0.37	315.	0.9347	CU	4.74
15.000	5.73	0.44	378.	0.9232	CU	4.87
15.060	5.72	0.44	379.	0.9231	CU	4.88
15.020	5.96	0.68	609.	0.8859	CU	5.33
14.990	6.01	0.71	640.	0.8819	CU	5.39
14.990	5.97	0.75	67[illegible]	0.8744	CU	5.45
14.990	6.86	1.44	1481.	0.7901	CU	6.70
15.030	6.93	1.48	1542.	0.7864	CU	6.77
15.020	6.91	1.49	1546.	0.7844	CU	6.78
15.000	7.11	1.71	1824.	0.7595	CU	7.15
15.010	7.17	1.75	1883.	0.7559	CU	7.22
15.010	7.33	1.82	2002.	0.7517	CU	7.35

US = 4.920 + 1.339*UP KM/SEC   UP GREATER THAN 0.65 KM/SEC
SIG US = .086 KM/SEC

COMMENTS:

1) SOURCE: MCQUEEN, R.G., MARSH, S.P., TAYLOR, J.W., FRITZ, J.N., AND CARTER, W.J.
THE EQUATION OF STATE OF SOLIDS FROM SHOCK WAVE STUDIES, HIGH VELOCITY IMPACT PHENOMENA, KINSLOW (ED.) (ACADEMIC PRESS, NEW YORK, 1970) CHAPTER VII
2) EXPERIMENTAL TECHNIQUE: B
DATA REDUCTION TECHNIQUE: B
3) FROM WYCKOFF, CRYSTAL STRUCTURES (JOHN WILEY AND SONS, N.Y., 1963) VOL. 1
4) V(OP-CE) < 1.5, HEL = 40. KBAR
5) HUGONIOT ELASTIC LIMIT 40. KBAR

TABLE I



57-1---1
RUTILE, CRYSTAL AND NATURAL (TITANIUM OXIDE)

TI-02

VO = 0.235 TO 2.38 CC/G
VOI= 0.2353 CC/G

THE TABLE LISTS SHOCK AND PARTICLE VELOCITY IN KM/SEC., PRESSURE IN KBARS AND DENSITY IN G/CC. ST DESIGNATES THE STANDARD SAMPLE HOLDER MATERIAL.

TABLE

RHOO	US	UP	P	V/VO	US(ST)
4.25	8.33	2.92	1033	0.650	9.75
4.21	8.51	2.98	1068	0.650	9.86
4.25	8.74	3.11	1157	0.644	10.08
4.25	8.77	3.13	1165	0.644	10.10
4.25	8.76	3.13	1165	0.643	10.11
4.25	9.06	3.22	1242	0.644	10.28
4.20	8.90	3.25	1213	0.635	10.25
4.25	8.94	3.25	1235	0.636	10.29

US = 2.926 + 1.865*UP KM/SEC.
SIGMA US = 0.070 KM/SEC.

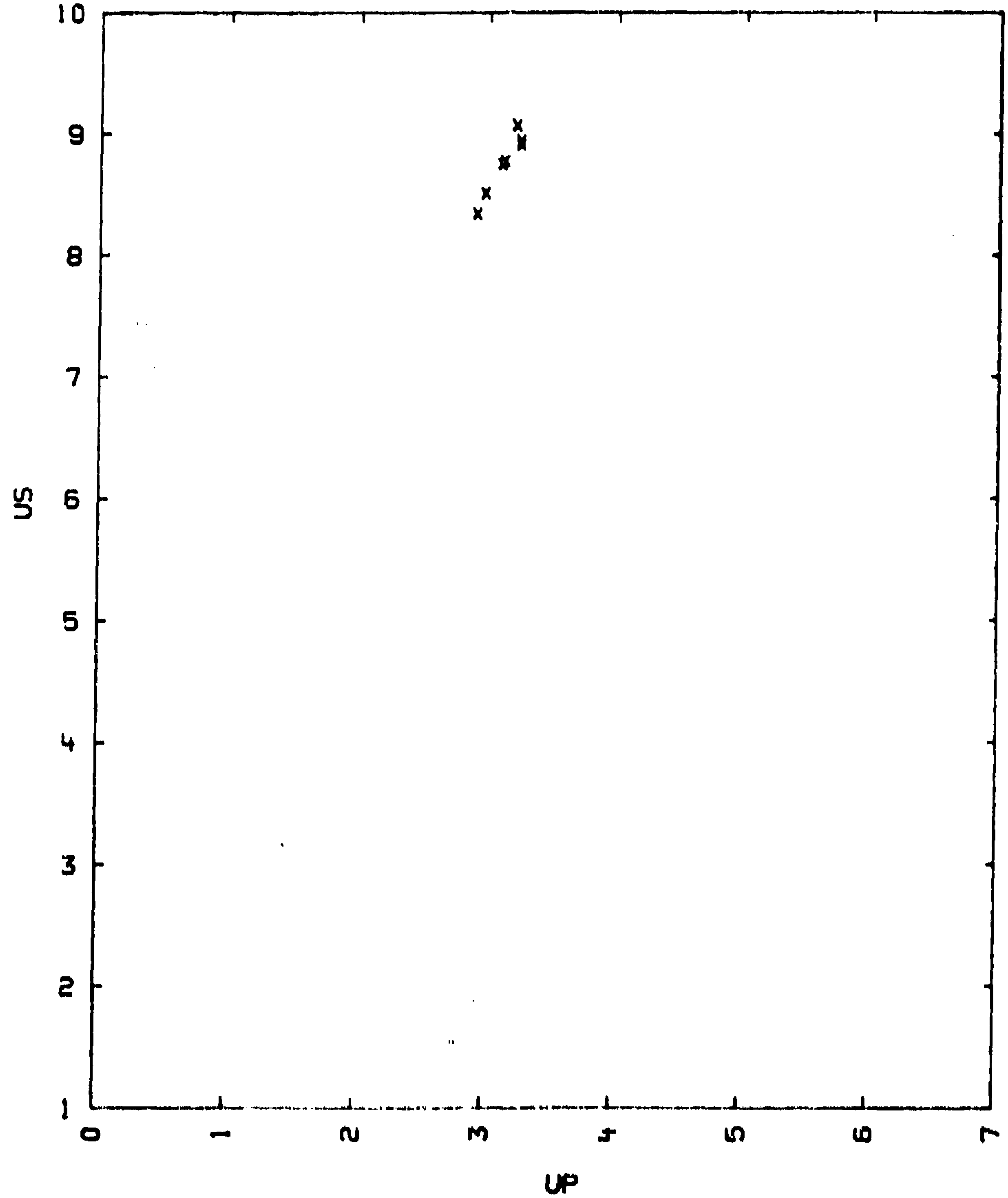
COMMENTS :

1) SOURCE: MCQUEEN R.G. AND MARSH S.P.
PRIVATE COMMUNICATION
LOS ALAMOS SCIENTIFIC LABORATORY, LOS ALAMOS, NEW MEXICO, USA
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION METHOD B STANDARD MATERIAL 2024 ALUMINUM
3) VOI WAS OBTAINED FROM T LATTICE PARAMETERS LISTED BY WYCKOFF
CRYSTAL STRUCTURES VOL. 1 (JOHN WILEY AND SONS, NEW-YORK, 1963)
4) FURTHER WORK IS IN PROGRESS.

TABLE 1

RUTILE, CRYSTAL AND NATURAL (TITANIUM OXIDE)

57-1---1



57-41-1---1
ILMENITE (IRON METATITANATE)

FE-TI-03

V0 = 0.260 TO 0.265 CC/G
V0I= 0.2075 CC/G

THE TABLE LISTS SHOCK AND PARTICLE VELOCITY IN KM/SEC., PRESSURE IN KBARS AND DENSITY IN G/CC. ST DESIGNATES THE STANDARD SAMPLE HOLDER MATERIAL.

TABLE

RHO0	US	UP	P	V/V0	US(ST)
3.84	7.41	2.36	673	0.681	8.76
3.78	7.44	2.47	692	0.669	8.86
3.77	7.43	2.47	691	0.668	8.86
3.77	7.93	2.72	814	0.657	9.26
3.84	8.43	3.04	983	0.640	9.75
3.83	8.88	3.26	1108	0.632	10.10

US = 3.317 + 1.691*UP KM/SEC.
SIGMA US = 0.069

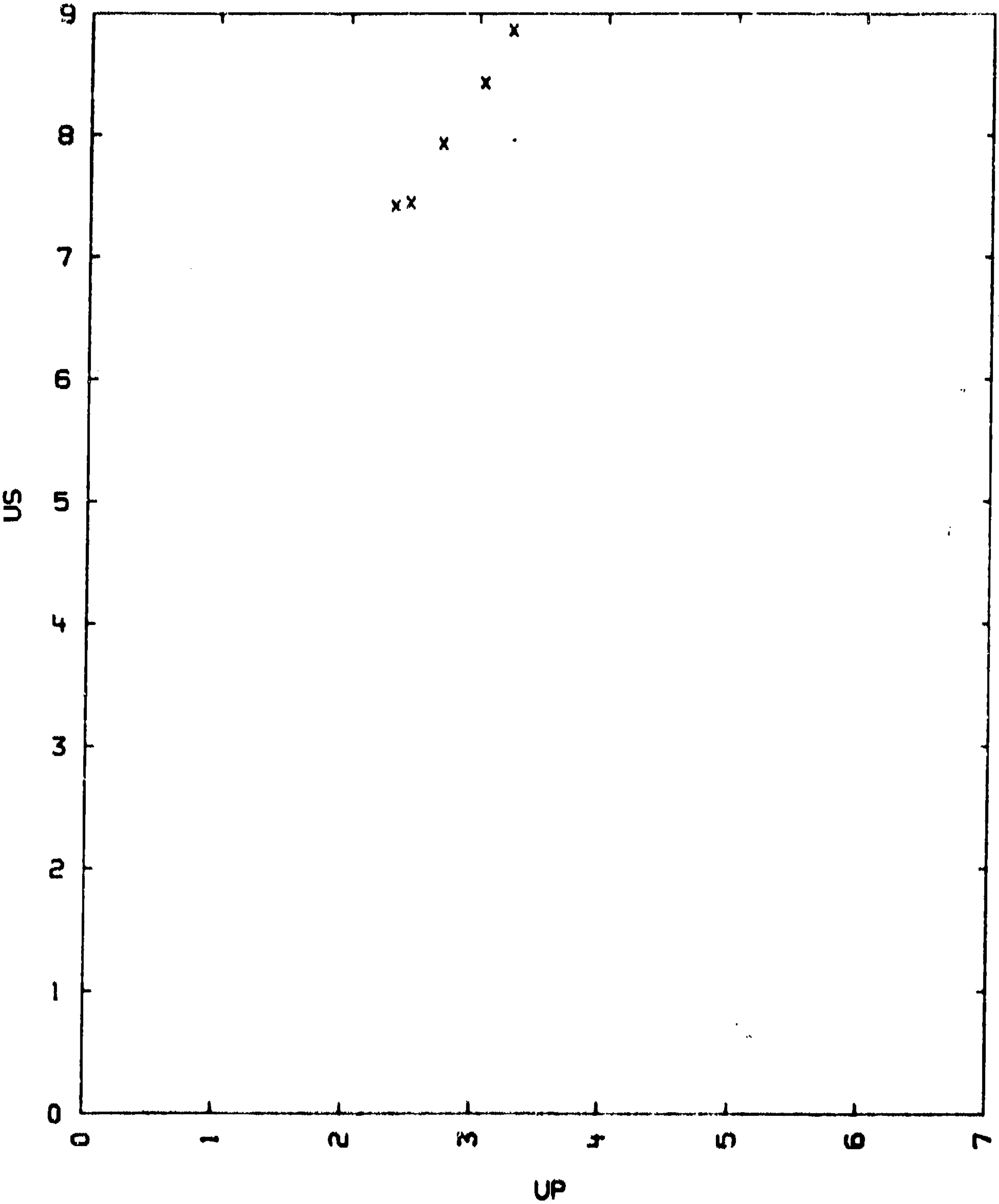
COMMENTS :

1) SOURCE: MCQUEEN R.G. AND MARSH S.P.
PRIVATE COMMUNICATION
LOS ALAMOS SCIENTIFIC LABORATORY, LOS ALAMOS, NEW MEXICO, USA
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION METHOD B STANDARD MATERIAL 2024 ALUMINUM
3) V0I WAS OBTAINED FROM THE LATTICE PARAMETERS LISTED BY WYCKOFF, CRYSTAL STRUCTURES, VOL. 2 (JOHN WILEY AND SONS, NEW-YORK 1963)
4) FURTHER WORK IS IN PROGRESS.

TABLE I

ILMENITE (IRON METATITANATE)

57-41-1---1



92-1---1
BERYLLIUM OXIDE POROUS

BE-O

VO = 0.342 - 0.498 CC/G
VOI = 0.3342 CC/G

THE TABLES BELOW LIST DENSITY IN G/CC, VELOCITIES IN KM/SEC AND PRESSURE IN KBARS

TABLE I

	SAMPLE					AL BASE PLATE
RHOO	US	UFS	UP	P	V/VO	PRESSURE
2.908	8.65	1.57	0.78	197	0.912	168
2.827	8.6		0.62	151	0.928	133
2.88	9.07	2.02	1.04	271	0.884	238
2.905	9.29	2.47	1.25	338	0.866	304
2.853	8.71	1.55	0.77	192	0.91	166
2.909	9.62	2.95	1.56	437	0.838	378
2.919	10.15	3.69	1.91	566	0.812	493
2.914	10.22	4.09	2.06	613	0.798	537
2.926	11.26	6.75	2.74	903	0.757	796
2.910	10.85	5.10	2.42	765	0.777	670

US = 7.72 + 1.27 UP KM/SEC
SIGMA US = 0.071 KM/SEC

TABLE II

	SAMPLE					AL BASE PLATE
RHOO	US	UFS	UP	P	V/VO	PRESSURE
2.60	7.01	1.97	1.25	228	0.822	236
2.663	10.85	6.17	3.46	1030	0.681	970
2.776	11.26	6.83	3.71	1161	0.671	1100
2.086	5.04	2.57	1.98	208	0.607	317
2.168	5.70	3.02	2.05	254	0.640	359
2.01	5.83	3.02	2.01	236	0.656	335

US =

COMMENTS:

1) SOURCE: COMPILER
L.R.L. EQUATION OF STATE FILE
LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA.
2) EXPERIMENTAL TECHNIQUE B. STANDARD MATERIAL 2024 AL ALLOY.

DATA REDUCTION TECHNIQUE B.
3) THE VALUE OF V01 WAS OBTAINED FROM A. TAYLOR AND BRENDA J. KAGLE, CRYSTALLOGRAPHIC DATA ON METAL AND ALLOY STRUCTURES (DOVER PUBLICATIONS, INC., NEW YORK, N. Y., 1963).

TABLE I

BERYLLIUM OXIDE POROUS

92-1---1

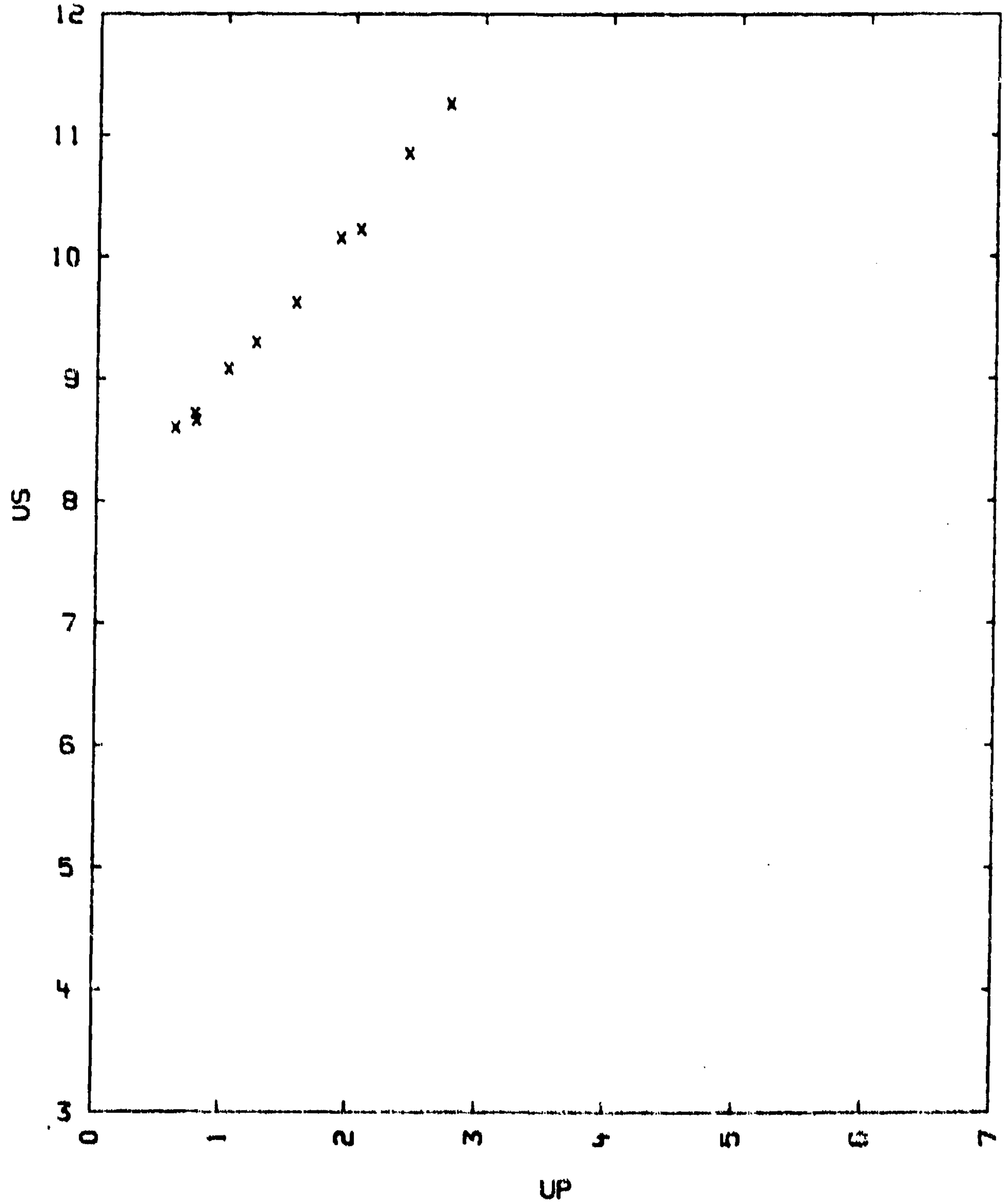
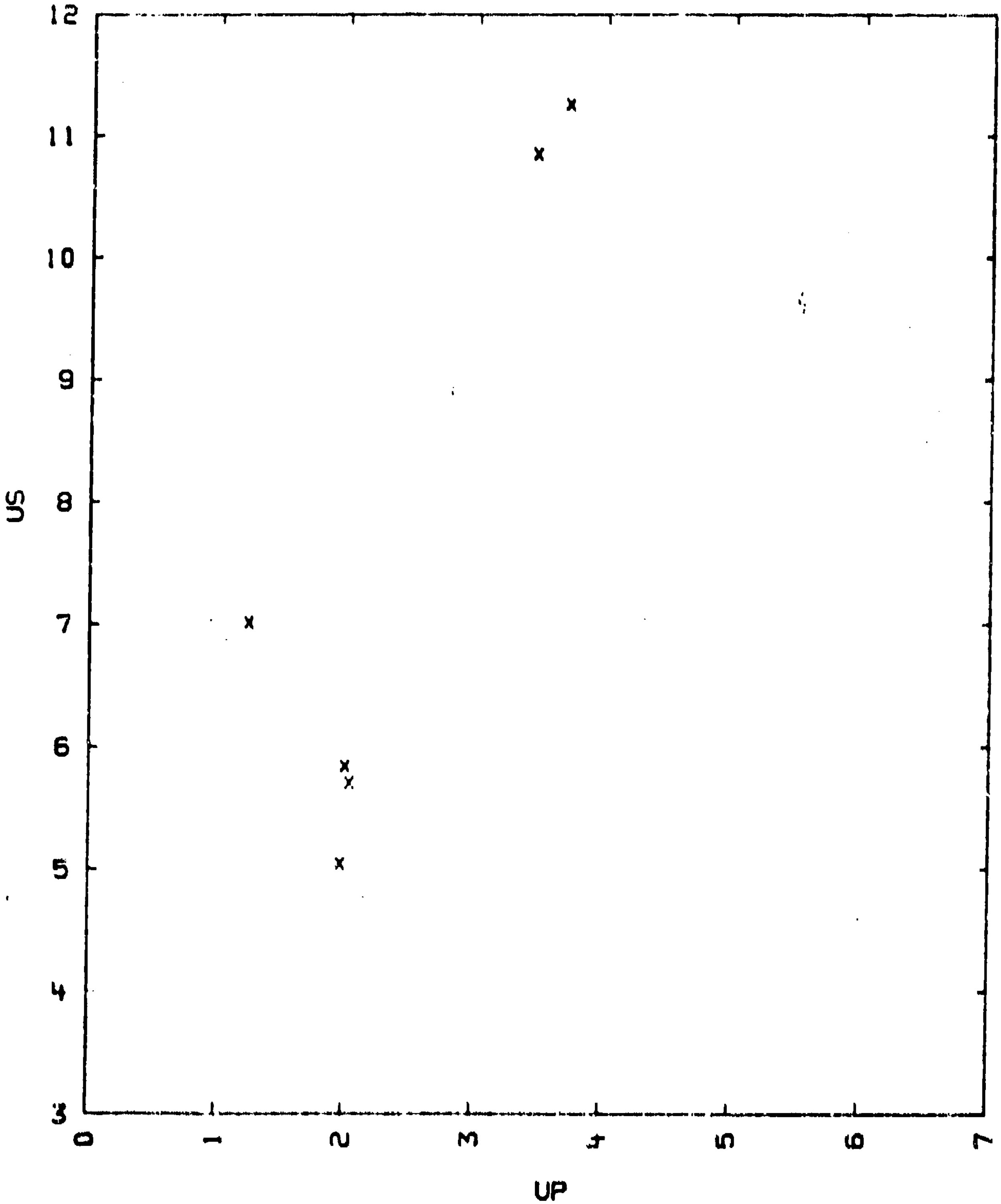


TABLE II

BERYLLIUM OXIDE POROUS

92-1---1



93-1---1
PERICLASE (MAGNESIUM OXIDE CRYSTALLINE)

MG-O

V0 = 0.2793 CC/G CO = 6.58 KM/SEC
V01= 0.2792 CC/G

THE TABLE LISTS SHOCK AND PARTICLE VELOCITY IN KM/SEC., PRESSURE IN KBARS AND DENSITY IN G/CC. ST DESIGNATES THE STANDARD SAMPLE HOLDER MATERIAL.

TABLE

RHO0	US	UP	P	V/V0	US(ST)
3.58	7.60	0.73	202	0.904	6.57
3.58	7.63	0.78	214	0.897	6.63
3.58	8.15	1.04	304	0.871	7.05
3.58	8.93	1.51	484	0.831	7.79
3.58	9.08	1.60	521	0.823	7.93
3.58	9.01	1.64	520	0.817	7.98
3.58	9.23	1.86	616	0.797	8.31
3.58	9.45	2.02	683	0.785	8.54
3.58	9.79	2.22	780	0.772	8.86
3.58	9.93	2.40	856	0.757	9.12
3.58	10.13	2.43	884	0.758	9.18
3.58	10.14	2.49	904	0.754	9.26
3.58	10.11	2.52	913	0.751	9.29
3.58	10.21	2.59	950	0.744	9.40
3.58	10.33	2.64	980	0.743	9.49
3.58	10.59	2.90	1102	0.725	9.86
3.58	10.67	2.97	1137	0.720	9.96
3.58	10.92	3.18	1244	0.708	10.25
3.58	10.96	3.20	1258	0.708	10.29

US = 6.535 + 1.643*UP - 0.083*UP**2 KM/SEC.
SIGMA US = 0.067 KM/SEC.

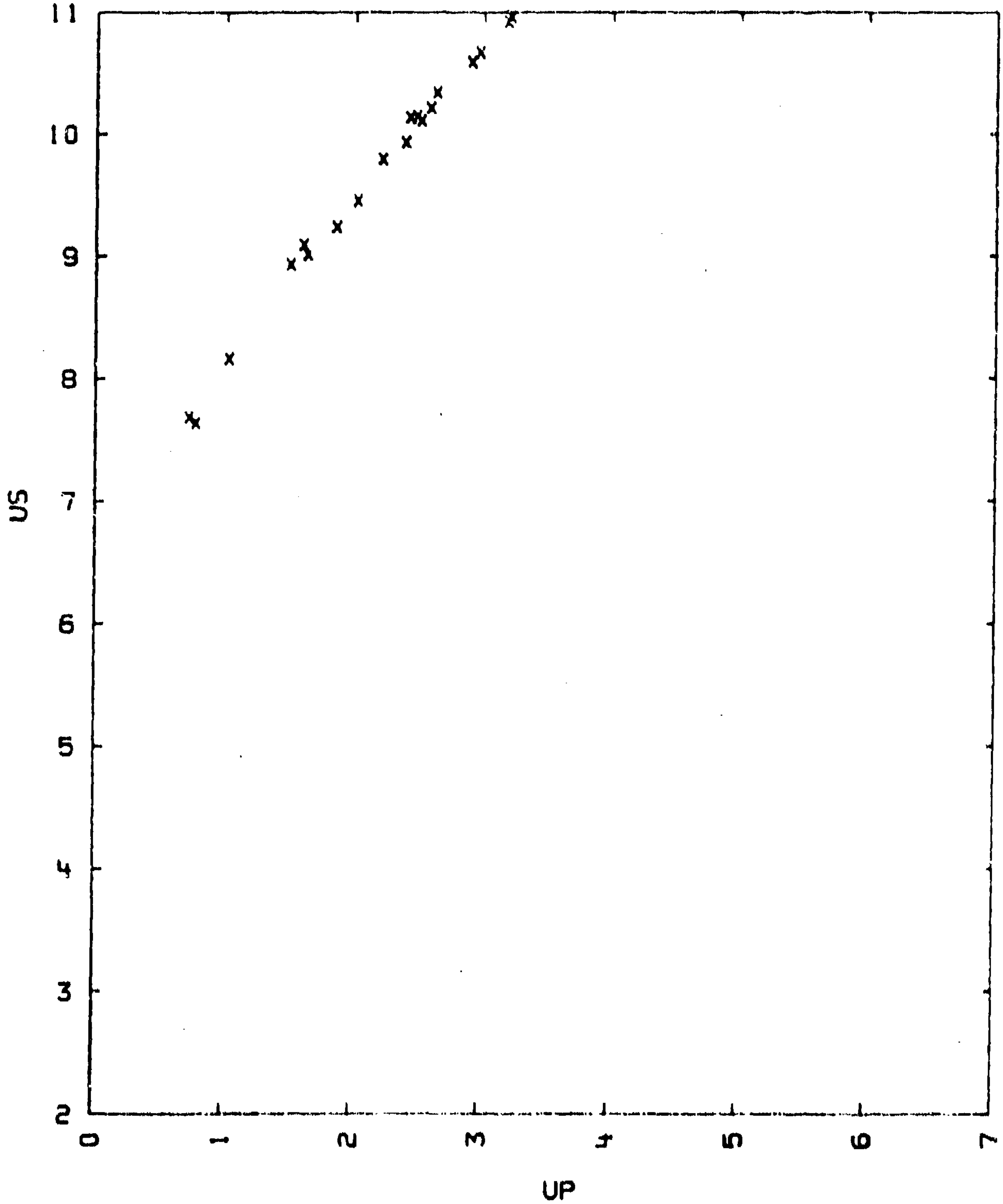
COMMENTS :

1) SOURCE: MCQUEEN R.G. AND MARSH S.P.
PRIVATE COMMUNICATION
LOS ALAMOS SCIENTIFIC LABORATORY, LOS ALAMOS, NEW MEXICO, USA
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION METHOD B STANDARD MATERIAL 2024 ALUMINUM
3) V01 WAS OBTAINED FROM THE LATTICE PARAMETERS LISTED BY WYCKOFF, CRYSTAL STRUCTURES VOL. 1 (JOHN WILEY AND SONS, NEW-YORK 1963)
4) FURTHER WORK IS IN PROGRESS.

TABLE I

PERICLASE (MAGNESIUM OXIDE CRYSTALLINE)

93-1---1



93-1---2
PERICLASE CERAMIC (MAGNESIUMOXIDE)

MG-O

V0 = 0.2920 G/CC
V01= 0.2789 G/CC

THE TABLE LISTS DENSITY IN G/CC, VELOCITIES IN KM/SEC AND PRESSURE IN KBARS.

TABLE

RHO0	US	UP	P	V/V0
3.425	7.63	1.32	345	0.827
-	9.31	2.52	803	0.729
-	13.42	5.62	2581	0.581

US = 5.89 + 1.34 UP KM/SEC
SIGMA US = 0.051 KM/SEC

COMMENTS:

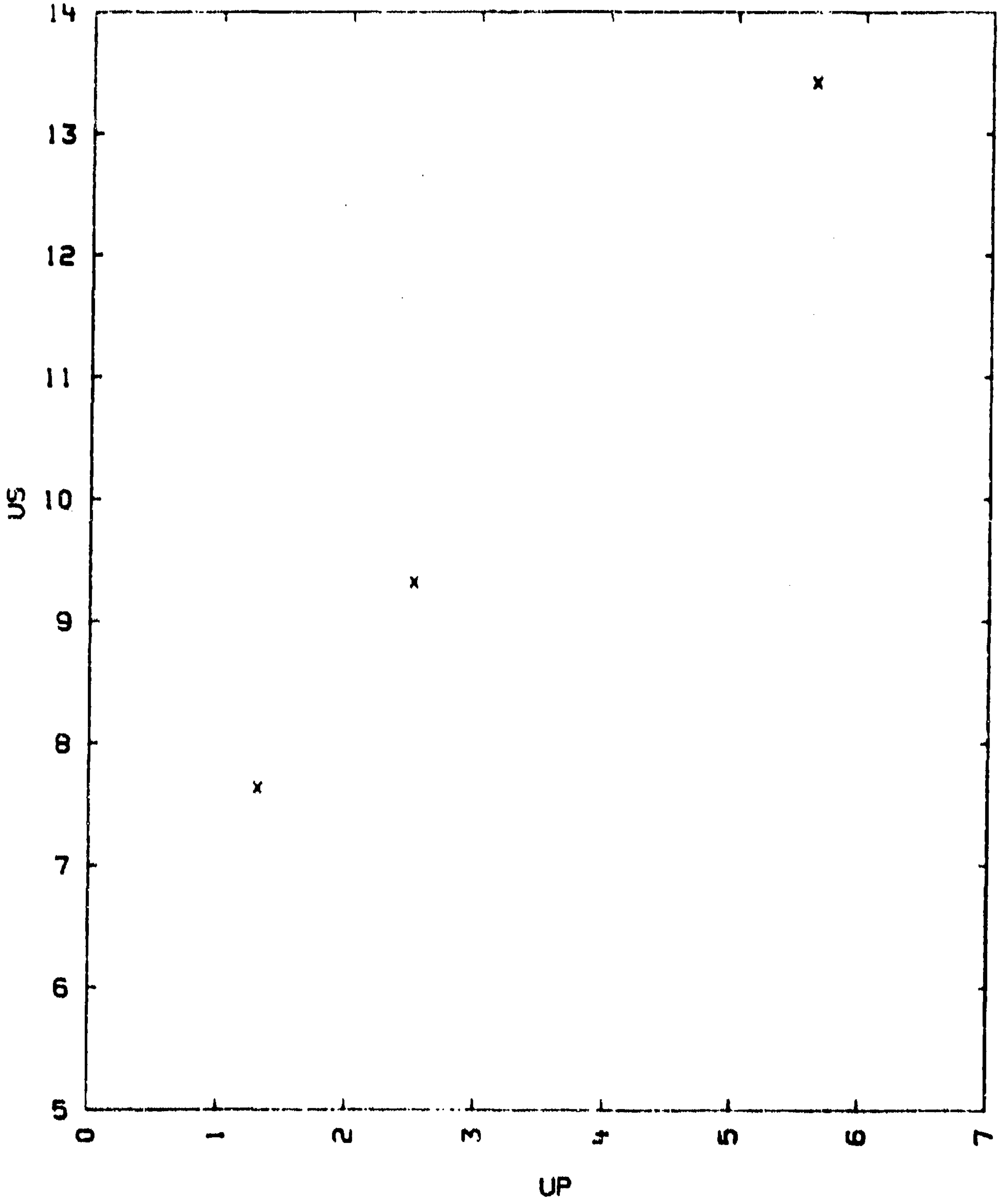
1) SOURCE: AL'TSHULER, L. V., TRUNIN, R. F., SIMAKOV, G. V.
IZV. AKADEMII NAUK SSSR. FIZIKA ZEMLI NO. 10, 1965 P.1-6.
2) EXPERIMENTAL TECHNIQUE - UNKNOWN.
DATA REDUCTION TECHNIQUE - UNKNOWN.
3) V01 WAS OBTAINED FROM A CUBIC LATTICE CONSTANT A=4.2112 ANGSTROM: WYCKOFF, CRYSTAL STRUCTURES VOL. 1 (JOHN WILEY AND SONS, N. Y. 1963)
4) ISOTHERMS AT 0 DEG. K AND AT 4000 DEG. K. WERE OBTAINED USING A GRUNEISEN GAMMA OF 1.0 AND HUGONIOT DENSITIES LISTED IN THE TABLE BELOW.

P	RHO(HUG)	RHO(0 DEG. K)	RHO(4000 DEG. K)
00	3.62	3.62	3.455
20	3.95	3.968	3.806
40	4.245	4.257	4.11
60	4.492	4.517	4.37
80	4.721	4.762	4.615
100	4.93	4.976	4.84
120	5.105	5.17	5.05
140	5.27	5.34	5.23
160	5.41	5.508	5.40
180	5.535	5.658	5.555
200	5.658	5.805	5.71
220	5.765	5.95	5.853
240	5.881	6.092	5.994
260	5.998	6.23	6.13

TABLE I

PERICLASE CERAMIC (MAGNESIUMOXIDE)

93-1---2



93-1---3
MAGNESIUM OXIDE, SINGLE-CRYSTAL (MAGNORITE)

MG-O

V0 = 0.2796 CC/G
V01 = 0.2789 CC/G

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN KM/SEC, AND PRESSURE IN KILOBARS.

TABLE

RHO01	US1	UP1	P1	V1/V0	US2	UP2	UFS	P2	V2/V0
3.576	9.191	0.1215	39.9	0.987	7.016	0.626	1.348	168	0.9147
-	9.142	0.1054	34.5	0.989	6.984	0.635	1.217	166	0.9122
-	10.068	0.2476	89.0	0.976	8.503	1.35	2.459	423	0.8466
-					6.893	0.633	1.256	166	0.9104
-					7.085	0.632	1.195	166	0.9133
-					7.881	1.229	2.678	390	0.879
-					9.61	1.92	3.733	660	0.801

US2 = 6.15 + 1.85*UP2 +OR- 0.3 KM/SEC

COMMENTS:

1) SOURCE: AHRENS, T. J.
JOURNAL OF APPLIED PHYSICS, VOL. 37, P. 2532 (1966).
2) EXPERIMENTAL TECHNIQUE C1
DATA REDUCTION METHOD A, WHERE 2UP = UFS
INTERACTION OF THE ELASTIC WAVE WITH THE SECOND SHOCK HAS CORRECTED. FOR
3) THE TABLE BELOW GIVES THE CALCULATED HUGONIOT TEMPERATURE (T) IN DEG. KELVIN AND HUGONIOT PRESSURE (P) IN KILOBARS.

T = 307, 323, 345, 375, 419, 485, 584, 733, 959, 1313
P = 42.9, 96.1, 163, 247, 354, 493, 674, 913, 1248, 1710

4) V01 WAS OBTAINED FROM A CUBIC LATTICE CONSTANT A = 4.2112 ANGSTROM; WYCKOFF, CRYSTAL STRUCTURES VOL. 1 (JOHN WILEY AND SONS, N. Y. 1963).
5) THE MAGNORITE SINGLE-CRYSTALS WERE OBTAINED FROM NORTON CO., NIAGARA FALLS, N. Y., U.S.A.
6) THE ACCURACY OF THE SHOCK AND PARTICLE VELOCITY MEARSUREMENTS ARE WITHIN 1 PERCENT.

TABLE I

MAGNESIUM OXIDE, SINGLE-CRYSTAL (MAGNORITE)

93-1---3

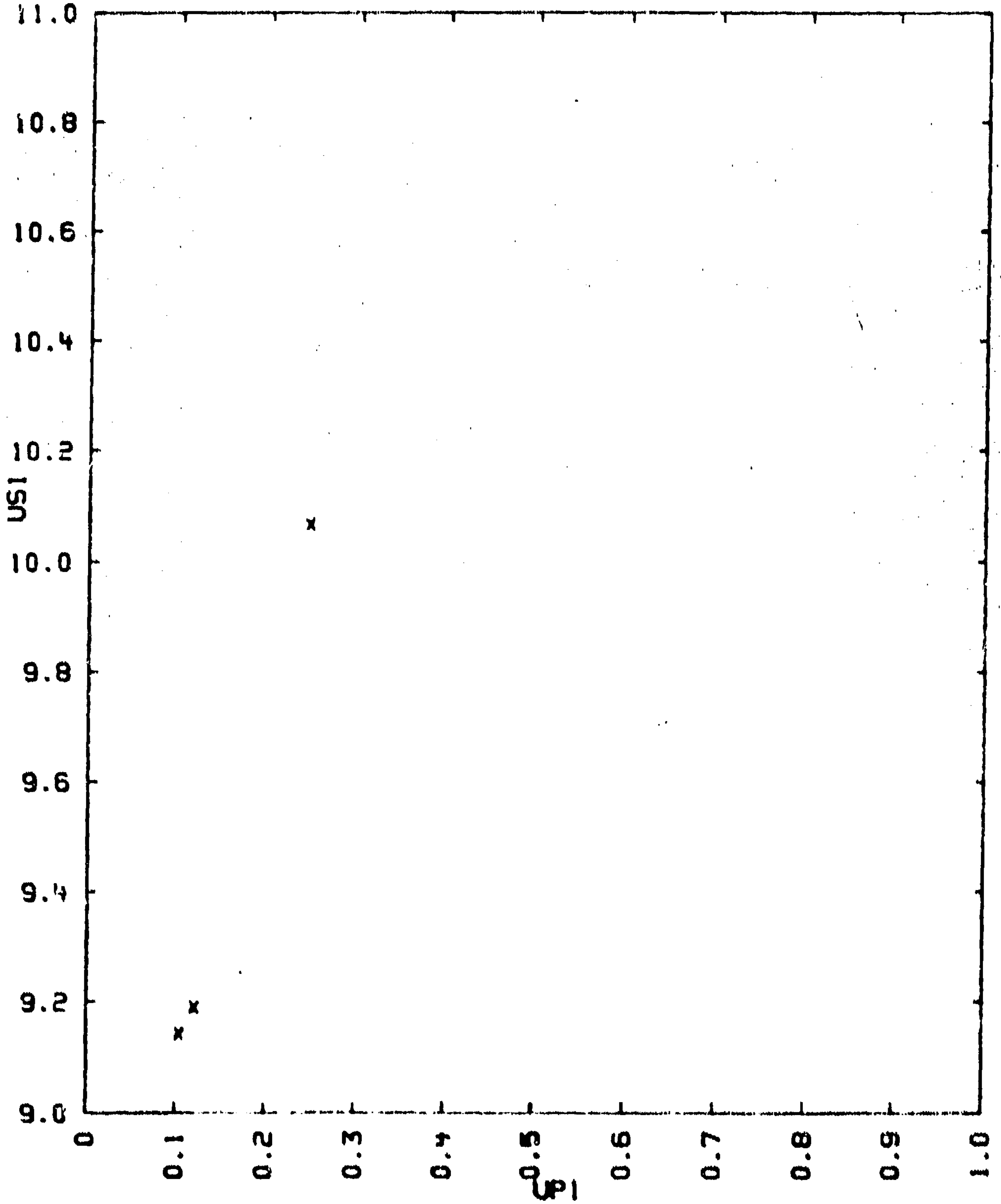
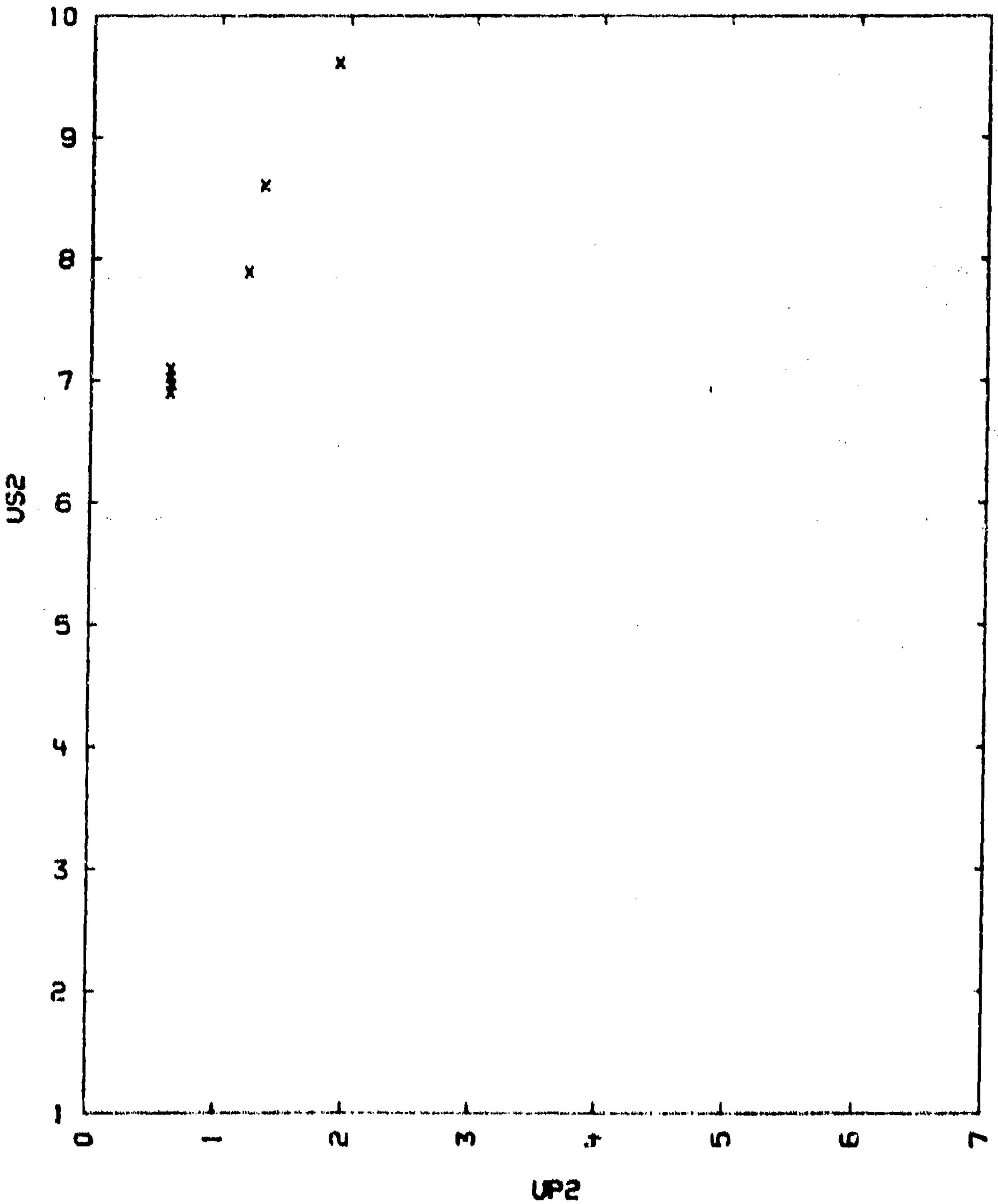


TABLE I

MAGNESIUM OXIDE, SINGLE-CRYSTAL (MAGNORITE)

93-1---3



93-24-1---1
ENSTATITE CERAMIC (MAGNESIUM METASILICATE)

MG-SI-03

VO = 0.369 CC/G
VOI= 0.3119 CC/G

THE TABLE LISTS SHOCK AND PARTICLE VELOCITY IN KM/SEC., PRESSURE IN KBARS AND DENSITY IN G/CC. ST DESIGNATES THE SAMPLE HOLDER AND STANDARD MATERIAL.

TABLE

RHOO	US	UP	P	V/VO	US(ST)
2.71	5.37	2.06	300	0.616	7.72
2.71	6.07	2.53	416	0.583	8.32
2.71	6.74	3.07	559	0.545	9.00
2.72	7.03	3.33	637	0.526	9.33

US = 2.718 + 1.304*UP KM/SEC.
SIGMA US = 0.051 KM/SEC.

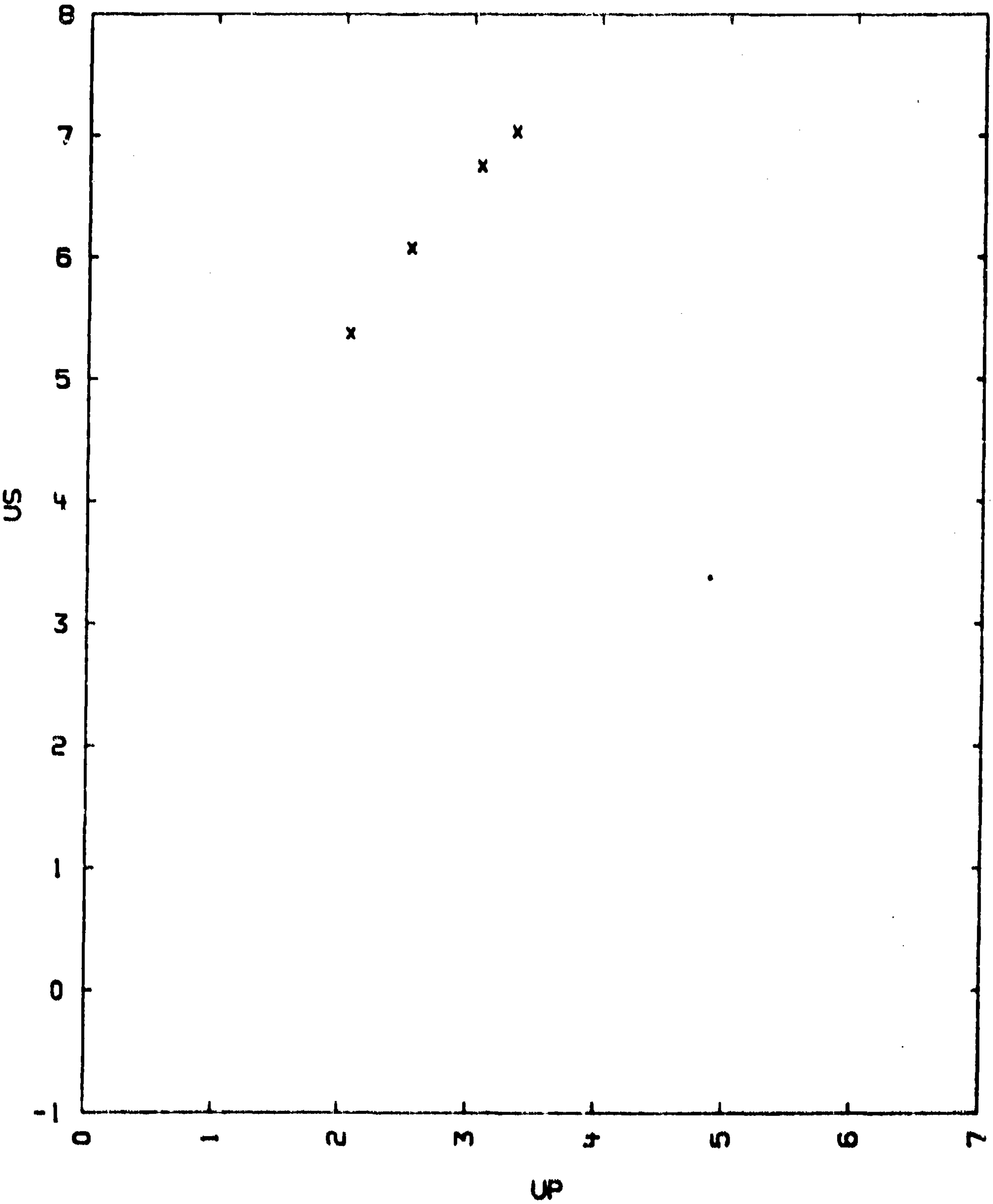
COMMENTS :

1) SOURCE: MCQUEEN R.G. AND MARSH S.P.
PRIVATE COMMUNICATION
LOS ALAMOS SCIENTIFIC LABORATORY, LOS ALAMOS, NEW MEXICO, USA
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION METHOD B STANDARD MATERIAL 2024 ALUMINUM
3) VOI WAS OBTAINED FROM THE LATTICE PARAMETERS LISTED IN CRYSTAL DATA DETERMINATIVE TABLES (AMERICAN CRYSTALLOGRAPHIC ASSN. MONOGRAPH 5, 1963) 2ND ED.
4) FURTHER WORK IN PROGRESS

TABLE I

ENSTATITE CERAMIC (MAGNESIUM METASILICATE)

93-24-1---1



93-24-1---2
FORSTERITE CERAMIC (MAGNESIUM ORTHOSILICATE)

MG2-SI-O4

V0 = 0.327 CC/G
V01= 0.3103 CC/G

THE TABLE LISTS SHOCK AND PARTICLE VELOCITY IN KM/SEC., PRESSURE IN KBARS AND DENSITY IN G/CC. ST DESIGNATES THE SAMPLE HOLDER AND STANDARD MATERIAL.

TABLE

RHO0	US	UP	P	V/V0	US(ST)
3.07	7.63	2.84	664	0.629	9.05
3.03	8.07	3.10	758	0.616	9.40
3.03	8.07	3.10	758	0.616	9.40
3.07	8.20	3.14	788	0.618	9.49
3.04	8.64	3.50	919	0.595	9.96
3.06	9.14	3.70	1035	0.594	10.28

US = 2.884 + 1.674*UP KM/SEC.
SIGMA US = 0.067 KM/SEC.

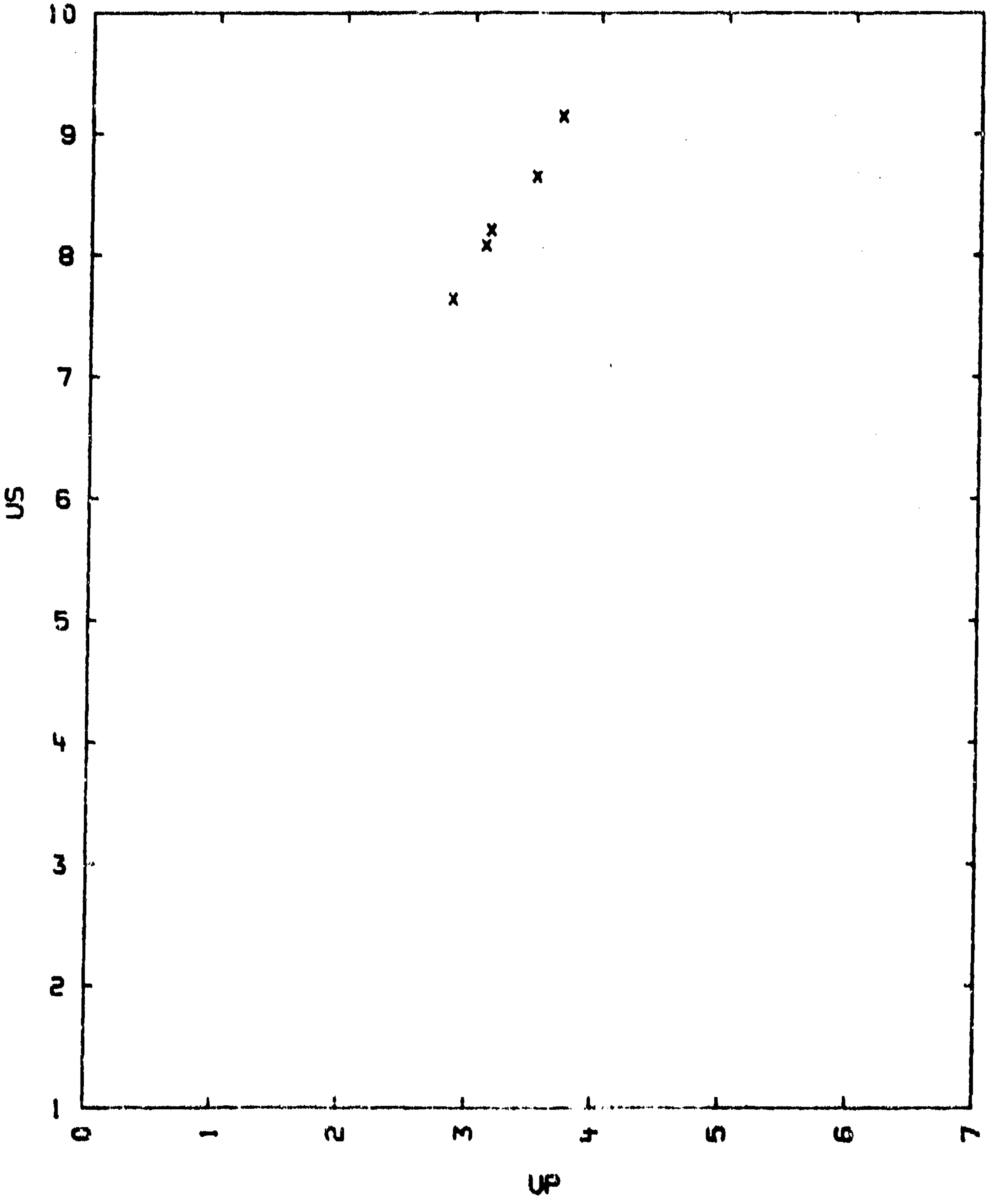
COMMENTS :

1) SOURCE: MCQUEEN R.G. AND MARSH S.P.
PRIVATE COMMUNICATION
LOS ALAMOS SCIENTIFIC LABORATORY, LOS ALAMOS, NEW MEXICO, USA
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION METHOD B STANDARD MATERIAL 2024 ALUMINUM
3) V01 WAS OBTAINED FROM THE LATTICE PARAMETERS LISTED IN CRYSTAL DATA DETERMINATIVE TABLES (AMERICAN CRYSTALLOGRAPHIC ASSN. MONOGRAPH 5, 1963) 2ND ED. THE ORTHOROMBIC CELL WITH A = 5.980 B = 10.20 AND C = 4.756 ANGSTROM WAS USED.
4) FURTHER WORK IN PROGRESS

TABLE I

FORSTERITE CERAMIC (MAGNESIUM ORTHOSILICATE)

93-24-1---2



93-24-1---3
FORSTERITE (OLIVINE) POLYCRISTALLINE

MO2-S1-04

VO = 0.321-3.81 CC/G
VOI= 0.3103 CC/G

THE TABLES LIST RHOO IN G/CC, VELOCITIES IN KM/SEC AND P IN KBAR. MAT IS THE IMPACTOR AND STANDARD MATERIAL. THE DU AND DUS VALUES ARE UNCERTAINTIES

TABLE IA

	SAMPLE						IMPACTOR	
NO	US1	DUS1	UP1	US2	DUS2	UP2	U	DU
1	5.91	0.03	0.031	4.19	0.05	1.01	1.201	0.005
2	5.82	0.08	-	4.21	0.04	1.03	1.17	0.04
3	5.83	0.05	-	4.98	0.08	1.21	1.42	

US =

TABLE IB

	SAMPLE						IMPACTOR
NO	RHOO	P1	V1/VO	P2	V2/VO	D	MAT
1	2.634	4.8	0.9948	113.	0.761	4.8	FS
2	2.627	4.7	0.9947	116.	0.757	4.83	-
3	2.633	4.7	0.9947	159.	0.7548	4.83	-

TABLE II

SAMPLE							IMPACTOR		
RHOO	US	DUS	UP	P	V/VO	D	MAT	U	DU
3.093	6.83	0.12	0.855	181.	0.875	6.27	FS	1.11	0.04
3.094	6.48	0.06	0.854	172.	0.868	6.26	-	1.107	0.005
3.087	6.74		0.897	187.	0.867	4.20	-	1.161	0.006
3.117	7.13	0.14	0.995	221.	0.860	4.54	-	1.305	0.01
3.119	7.28		0.975	222.	0.866	4.20	-	1.285	0.007
3.104	7.47	0.04	1.16	269.	0.845	6.25	-	1.53	0.02
3.102	7.33	0.09	1.35	307.	0.816	4.57	-	1.77	0.02
3.115	7.34	0.06	1.63	373.	0.778	4.54	-	2.132	0.007

US= 7.28 + 0.036*UP FOR UP BETWEEN 1.35 AND 1.63

COMMENTS:

1) SOURCE: AHRENS, T.J., LOWER, J.H. AND LAGUS, P.L.
J. GEOPHYS. RES. VOL 76 P.518 (1971)
2) EXPERIMENTAL TECHNIQUE C1
DATA REDUCTION TECHNIQUE B
3) DATA REDUCTION IS BASED ON IMPEDENCE MATCH WITH TUNGSTEN ALLOY (90.4 PER CENT W, 4.65 PER CENT NI, 4.9 PER CENT CU) BASE PLATE. SYMMETRIC IMPACT WAS USED BY FIRING THE SAME ALLOY FLYER PLATE FROM A PROPELLANT GUN.
4) LOW DENSITY MATERIAL WAS PRESSED AGGREGATE OF FORSTERITE FROM ATOMERGIC CORP. SMALL AMOUNTS OF AN AL BEARING PHASE, PROBABLY MG-AL2-O4 WERE INFERRED FROM MICROPROBE ANALYSIS OF THIS MATERIAL. THIS IMPURITY INCREASES RHO0 BY ABOUT 0.02 G/CC.
5) HIGH DENSITY MATERIAL WAS FUSED FROM OXIDES BY MUSCLE SHOALS ELECTROCHEMICAL CORP. IT CONTAINED 0.04 WT. PERCENT FE-SI, BUT LESS THAN 0.5 PER CENT FE IN THE FORSTERITE PHASE.
6) THE WEAK PRECURSOR OBSERVE IN THE SHOTS OF TABLE II WAS IGNORED IN THE DATA REDUCTION SINCE ITS STRESS WAS LESS THAN 5. KBAR AND UNCERTAIN
7) FOR THE HIGH DENSITY MATERIAL THE SECOND WAVE WAS ASSUMED TO BE INCIDENT ON MATERIAL WITH ZERO INITIAL VELOCITY AND PRESSURE.

TABLE IA

FORSTERITE (OLIVINE) POLYCRISTALLINE

93-24-1---3

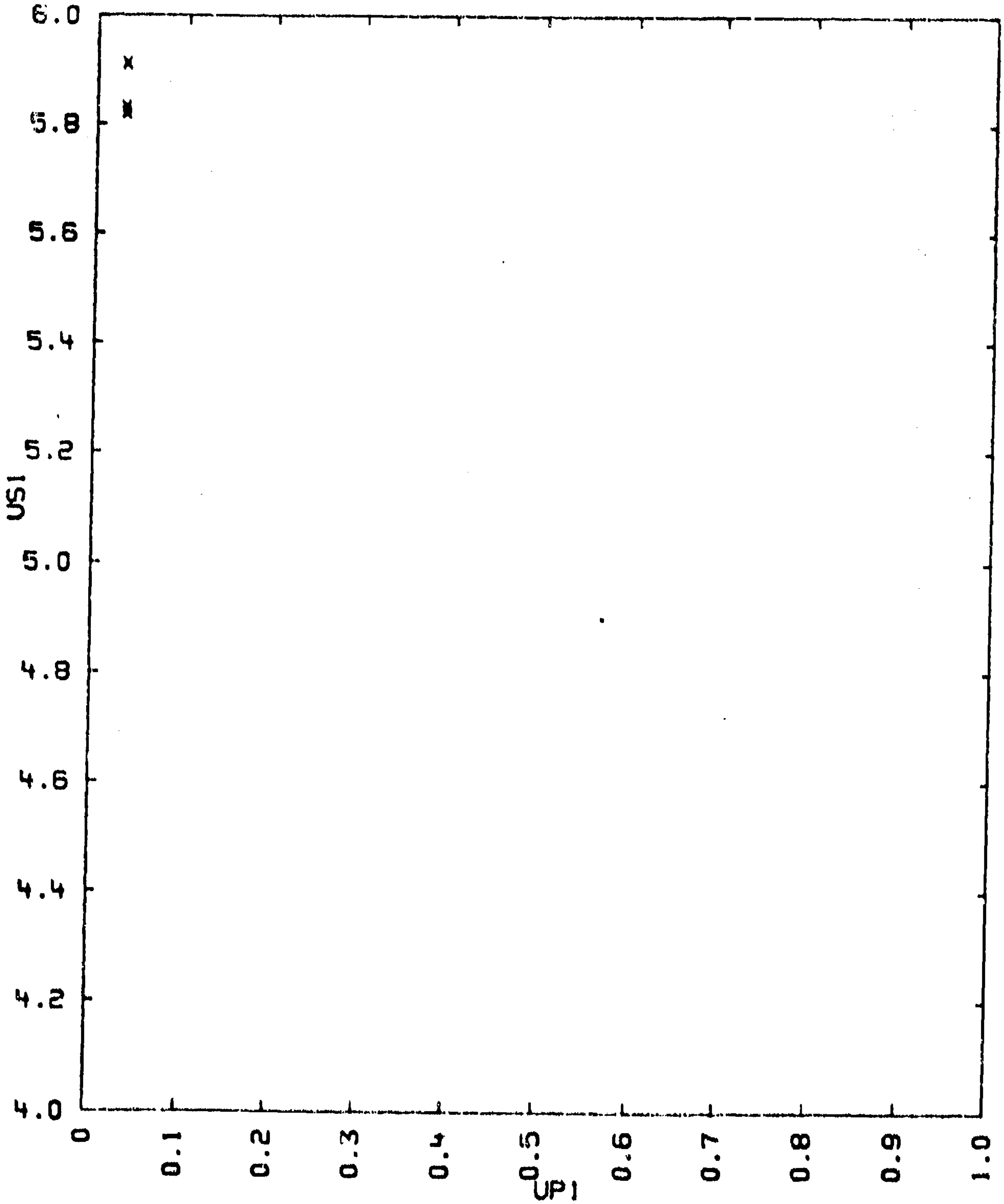


TABLE IA

FORSTERITE (OLIVINE) POLYCRISTALLINE

93-24-1---3

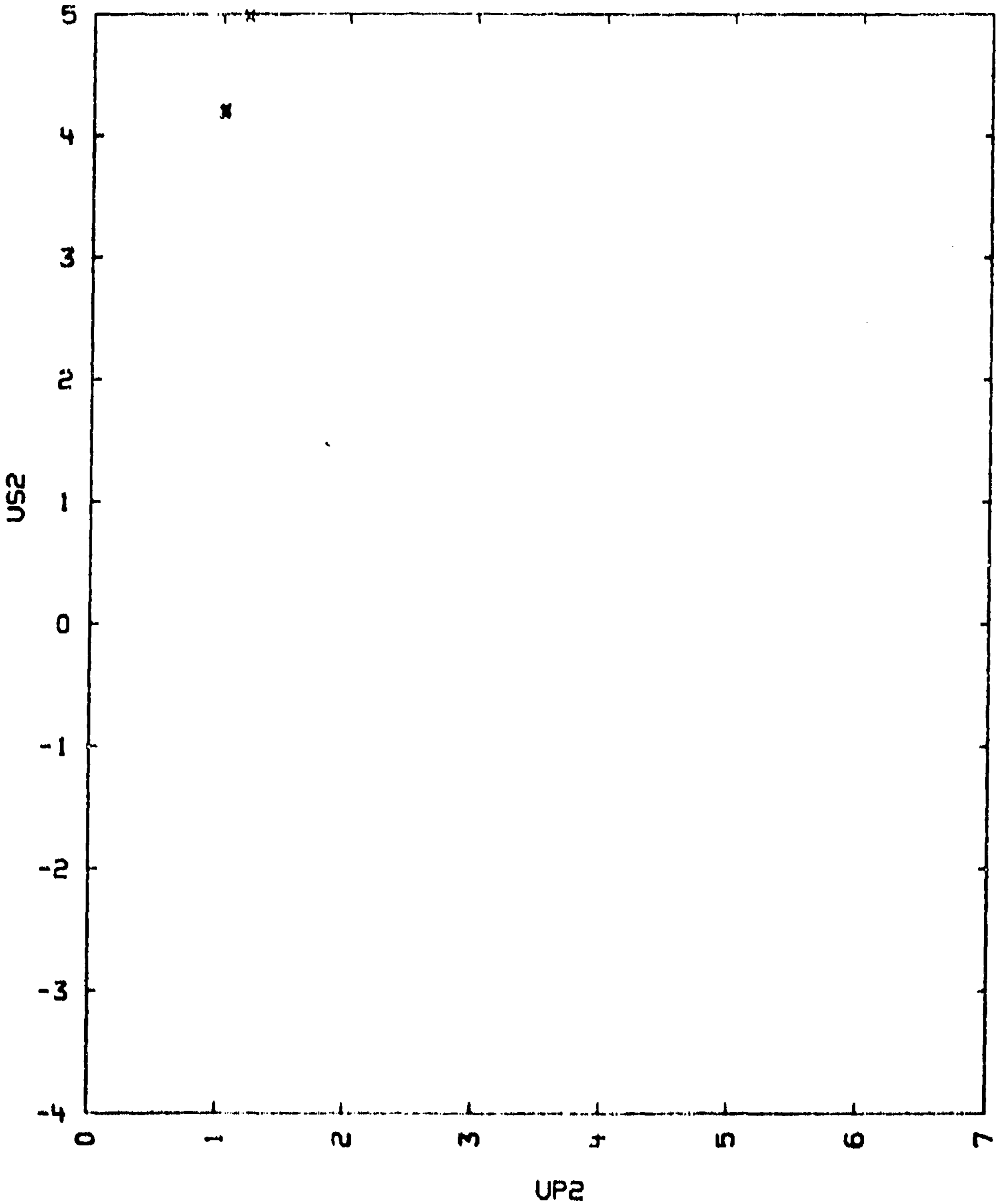
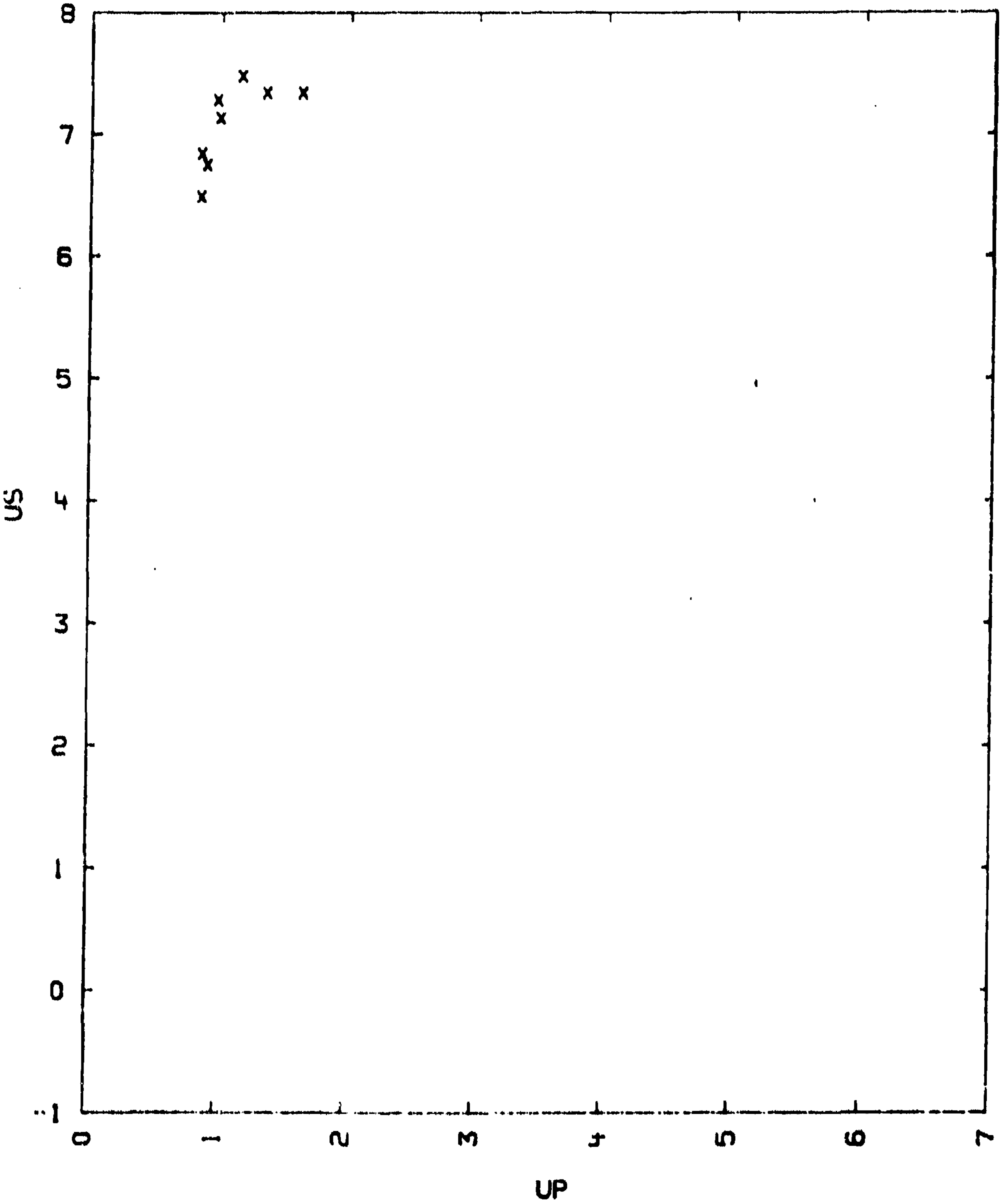


TABLE II

FORSTERITE (OLIVINE) POLYCRISTALLINE

93-24-1---3



93-24-2-1-·-1
SERPENTINE, VER-MYEN (MAGNESIUM SILICATE-HYDROUS)

MG6-SI4-H8-O18 = MG6-SI4-O10-(O-H)8

V0 = 0.357 CC/G
V01= 0.377 CC/G

THE TABLE LISTS SHOCK AND PARTICLE VELOCITY IN KM/SEC., PRESSURE IN KBARS AND DENSITY IN G/CC. ST DESIGNATES THE SAMPLE HOLDER AND STANDARD MATERIAL.

TABLE

RHOO	US	UP	P	V/VO	US(ST)
2.78	7.60	2.72	575	0.642	8.80
2.79	8.44	3.25	766	0.615	9.52
2.80	8.43	3.35	792	0.602	9.64
2.76	8.63	3.40	809	0.607	9.70
2.83	9.01	3.53	901	0.607	9.95
2.84	9.12	3.63	940	0.602	10.08

US = 3.017 + 1.666*UP KM/SEC.
SIGMA US = 0.11 KM/SEC.

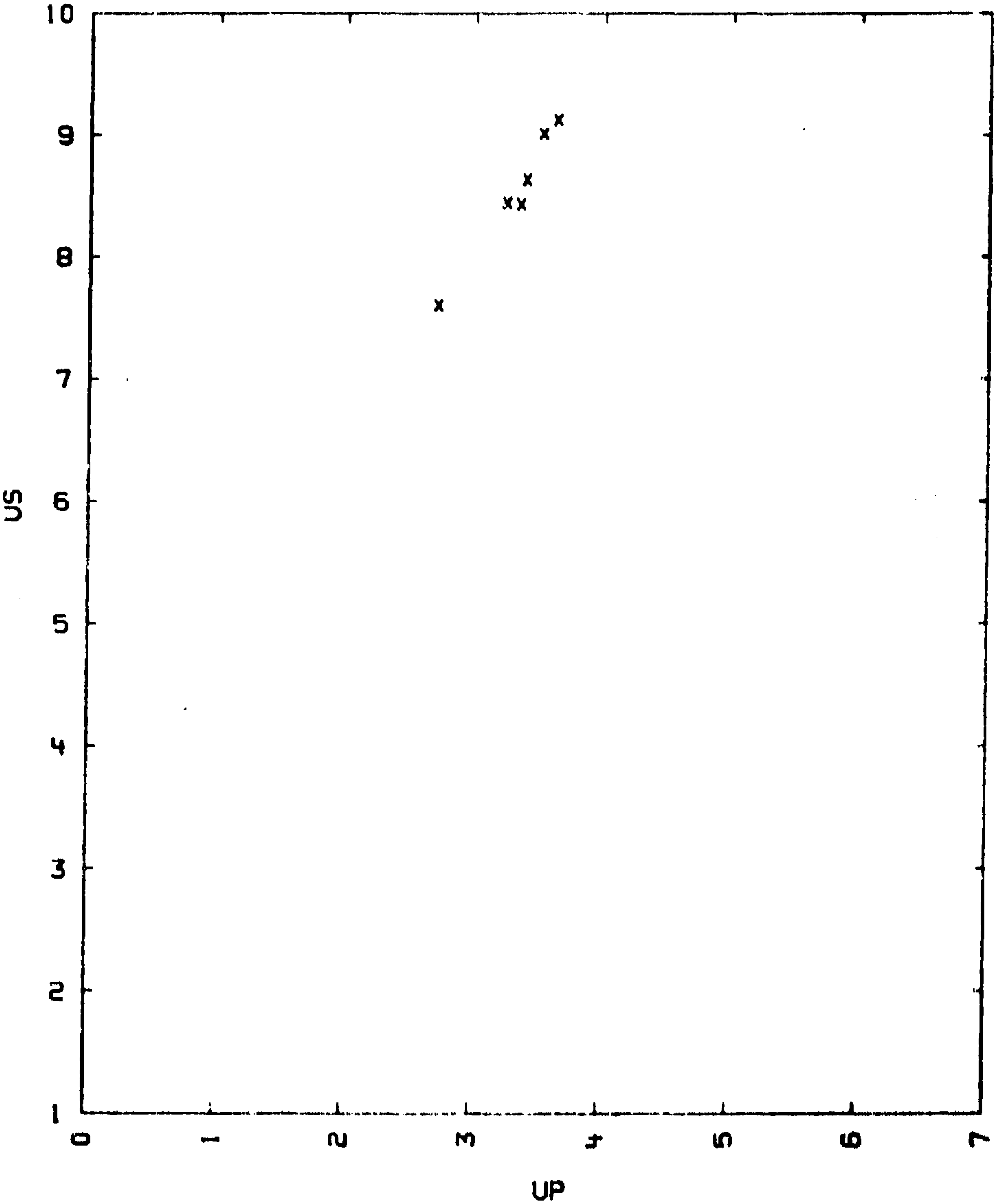
COMMENTS :

1) SOURCE: MCQUEEN R.G. AND MARSH S.P.
PRIVATE COMMUNICATION
LOS ALAMOS SCIENTIFIC LABORATORY, LOS ALAMOS, NEW MEXICO, USA
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION METHOD B STANDARD MATERIAL 2024 ALUMINUM
3) VOI WAS OBTAINED FROM DANAS MANUAL OF MINERALOGY (JOHN WILEY AND SONS INC. NEW-YORK, 1959)
4) FURTHER WORK IN PROGRESS

TABLE I

SERPENTINE, VER-MYEN (MAGNESIUM SILICATE-HYDROUS)

93-24-2-1---1



93-29-1---1
SPINEL (MAGNESIUM ALUMINATE CERAMIC)

MG-AL2-O4

V0 = 0.294 TO 0.292 CC/G
V01= 0.2792 CC/G

THE TABLE LISTS SHOCK AND PARTICLE VELOCITY IN KM/SEC., PRESSURE IN KBARS AND DENSITY IN G/CC. ST DESIGNATES THE STANDARD SAMPLE HOLDER MATERIAL.

TABLE

RHO0	US	UP	P	V/V0	US(ST)
3.41	8.46	2.35	678	0.722	8.76
3.42	8.54	2.53	740	0.702	9.00
3.43	9.09	2.79	871	0.763	9.40
3.43	9.09	2.80	871	0.763	9.40
3.43	9.16	2.85	896	0.763	9.49
3.43	9.13	2.86	894	0.762	9.49
3.41	9.41	3.05	979	0.631	9.75
3.42	9.62	3.19	1046	0.632	9.96
3.41	9.91	3.25	1098	0.631	10.08
3.40	9.76	3.29	1093	0.628	10.10
3.41	9.95	3.41	1158	0.629	10.20

US = 4.838 + 1.511*UP KM/SEC.
SIGMA US = 0.078 KM/SEC.

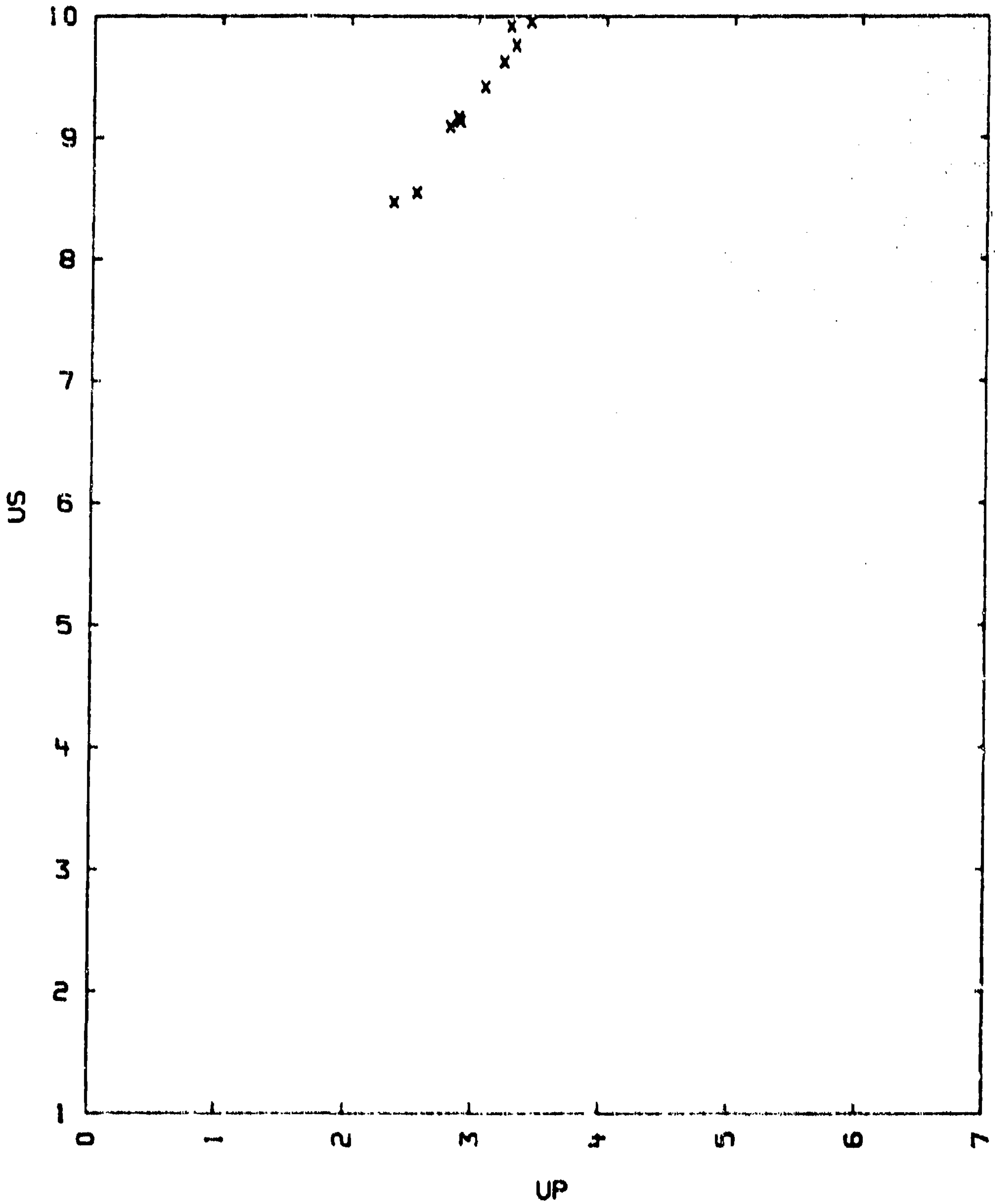
COMMENTS :

1) SOURCE: MCQUEEN R.G. AND MARSH S.P.
PRIVATE COMMUNICATION
LOS ALAMOS SCIENTIFIC LABORATORY, LOS ALAMOS, NEW MEXICO, USA
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION METHOD B STANDARD MATERIAL 2024 ALUMINUM
3) V01 WAS OBTAINED FROM THE LATTICE PARAMETERS LISTED BY WYCKOFF, CRYSTAL STRUCTURES, VOL. 3 (JOHN WILEY AND SONS, NEW-YORK 1963)
4) FURTHER WORK IS IN PROGRESS.

TABLE 1

SPINEL (MAGNESIUM ALUMINATE CERAMIC)

93-29-1---1



94-23-1---0
CALCIUMCARBONATE SUMMARY (CALCITE SUMMARY)

CA(C-O3)

V0 = 0.370 - 0.371 CC/G
V01= 0.3689 CC/G

THE TABLE LISTS HUGONIOT POINTS CALCULATED FROM THE FITS GIVEN BELOW. UNITS ARE G/CC, KM/SEC, KBAR AND KBAR.CC/G FOR THE ENERGY DIFFERENCE.

TABLE

FIT	RHOO	US	UP	P	V/VO	E-E0
1	2.70	4.234	.4	45.7	0.905	.80
1	-	4.772	.7	90	0.853	2.45
1	-	5.310	1.0	143	0.812	5.0
2	-	5.397	1.1	160	0.796	6.05
2	-	5.816	1.4	220	0.759	9.8
2	-	6.236	1.7	286	0.727	14.4
2	-	6.656	2.0	359	0.700	20.0
1	2.58	3.834	.4	39	0.896	.80
1	-	4.590	.8	95	0.826	3.20
1	-	5.347	1.2	165	0.775	7.20
2	-	5.666	1.5	219.	0.735	11.2
2	-	6.086	1.8	282.	0.704	16.2
2	-	6.505	2.1	352.	0.677	22.0
1	1.75	1.321	.5	11.6	0.621	1.25
1	-	2.603	1.0	45.	0.616	5.0
1	-	3.885	1.5	102.	0.614	11.2
1	-	5.167	2.0	181.	0.613	20.0
1	-	6.448	2.5	282.	0.612	31.2
2	-	4.637	2.2	178	0.525	24.2
2	-	5.196	2.6	236	0.500	33.8
2	-	5.756	3.0	302	0.479	45.0
2	-	6.455	3.5	395	0.458	61.2
2	-	7.155	4.0	501	0.441	80.

US = 3.553 + 1.786*UP - 3.66(2.71-RHOO) + 0.81(2.71-RHOO)UP (FOR FIT 1)
SIG.US = 0.15 KM/SEC. FOR THE LIMITS INDICATED BY THE TABLE.
US = 3.882 + 1.399*UP - 2.42(2.71-RHOO) (FOR FIT 2)
SIG.US = 0.09 KM/SEC. FOR THE LIMITS INDICATED BY THE TABLE.

COMMENTS

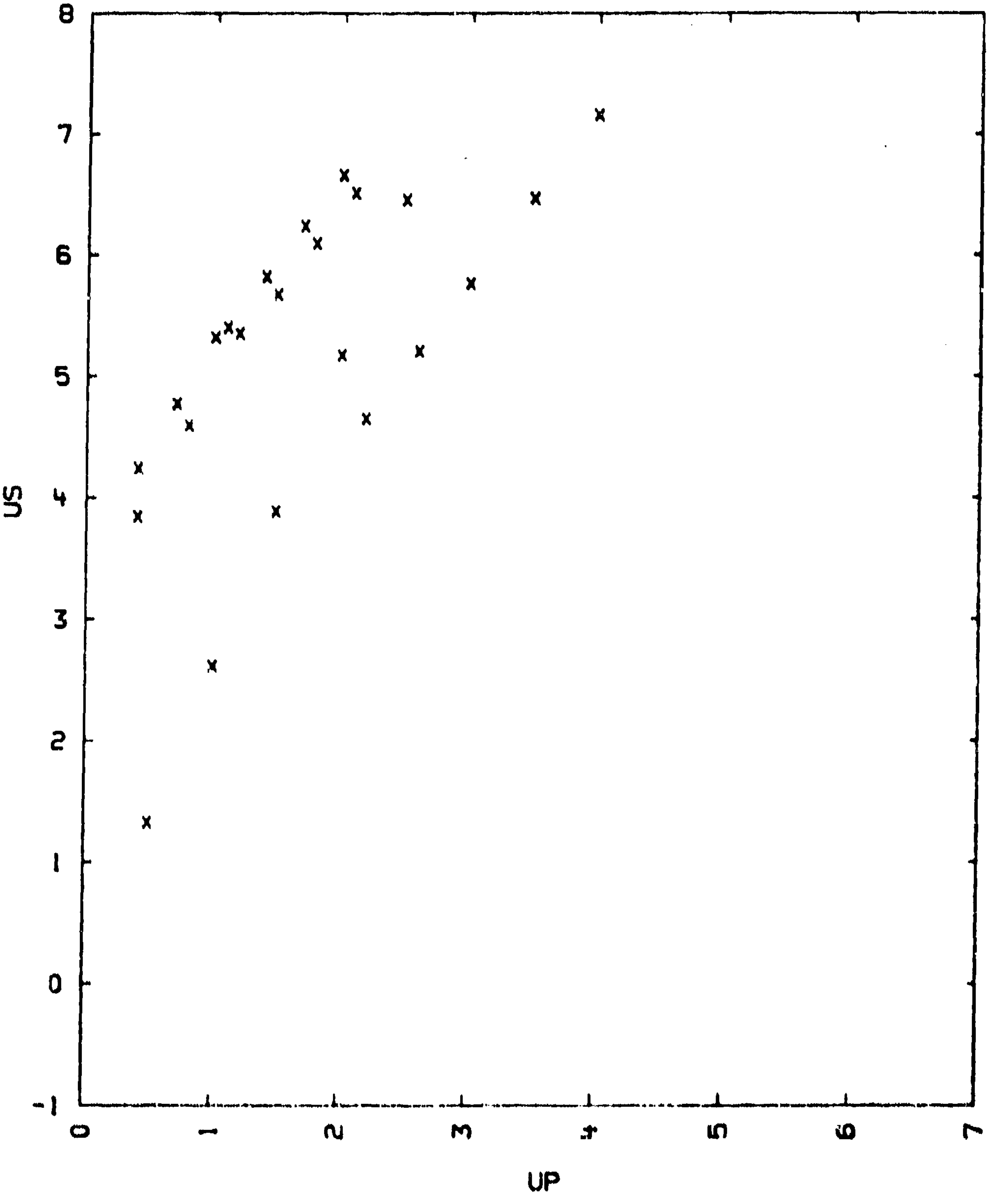
1) SOURCE: COMPILER
DATA FROM PAGES 94-23-1---1,6 AND 7 WERE USED FOR THIS SUMMARY.

2) PAGE 94-23-1---5 INDICATES A LARGE NUMBER OF TRANSITIONS AT LOW PRESSURES. TABLE III OF THAT ENTRY GIVES THE BEST CALCITE RESULTS BELOW THE ABOVE TABULATED RANGE.
3) THE REMAINDER OF THE DATA SUFFERS FROM GREATER UNCERTAINTIES AND (OR) A LOWER PURITY.
4) VOI HAS BEEN CALCULATED FROM THE HEXAGONAL LATTICE CONSTANTS A = 4.99008 AND C = 17.05951 AT 18 DEG. K. WYCKOFF, CRYSTAL STRUCTURES, VOL 2 (INTERSCIENCE PUBL., N.Y. 1964) 2ND. ED.

TABLE I

CALCIUMCARBONATE SUMMARY (CALCITE SUMMARY)

94-23-1---0



94-23-1---1
MARBLE

CA(C-03)

VO = 0.370 CC/G
VOI = 0.368 CC/G

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN MM/MICROSEC, AND PRESSURE IN KILOBARS.

TABLE

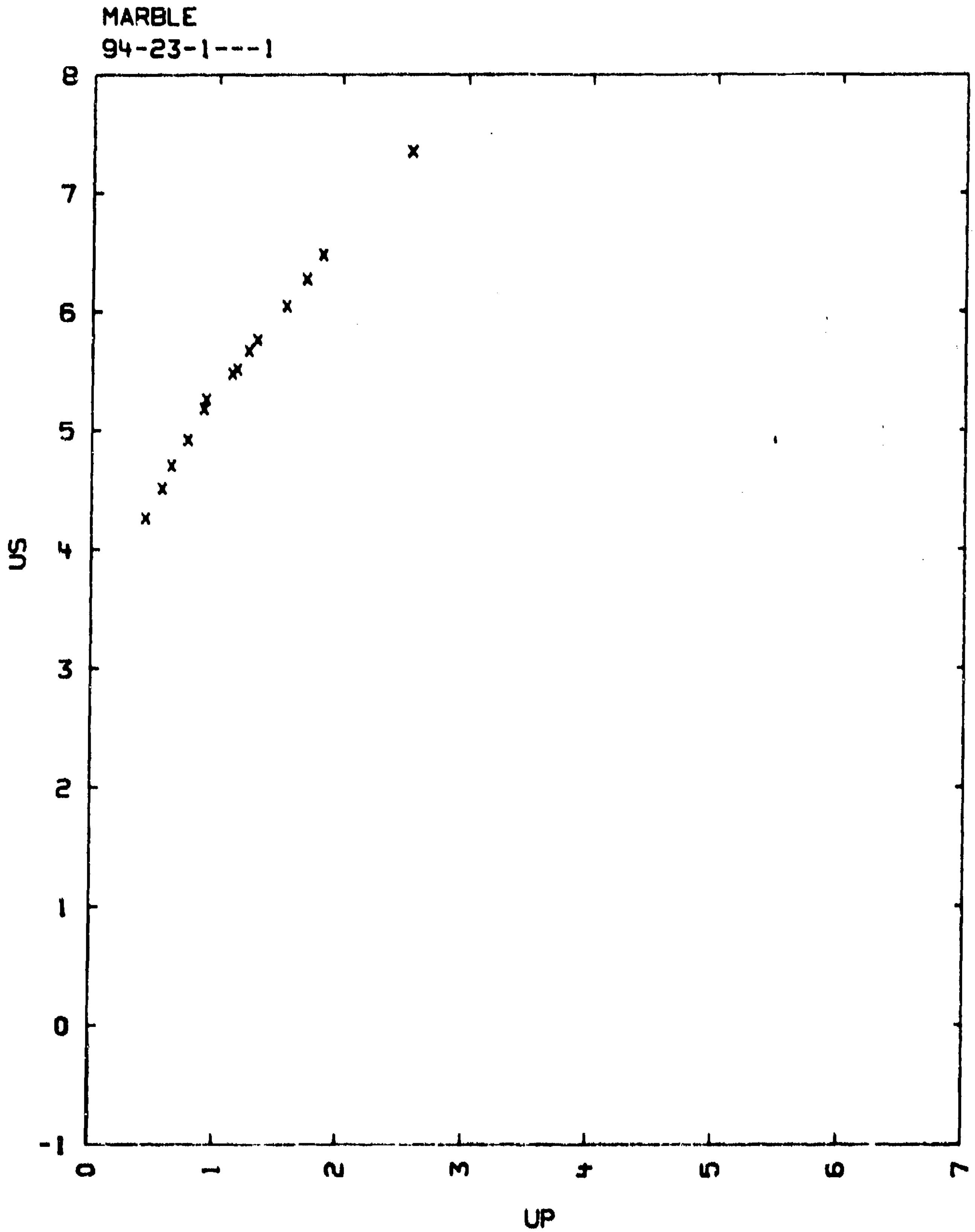
US	UP	P	V/VO
4.26	0.43	50	0.989
4.51	0.56	68	0.876
4.70	0.64	82	0.861
4.92	0.77	102.5	0.8475
5.18	0.90	125	0.826
5.26	0.92	131	0.825
5.47	1.125	168	0.794
5.51	1.17	174	0.7875
5.66	1.26	193	0.781
5.76	1.33	208	0.764
6.04	1.56	252	0.741
6.27	1.72	291	0.725
6.47	1.85	325	0.715
7.35	2.56	508	0.654

US =

COMMENTS:

1) SOURCE: DREMIN, A.N. AND ADADUROV, G.A.
SOVIET PHYS.-DOKLADY, VOL. 4, P. 970 (1959)
SOVIET PHYS.-DOKLADY VOL. 128, P. 261 (1959) (RUSS.)
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION TECHNIQUE B
3) IN THE ABOVE TABLE UNCERTAINTY IN VELOCITY IS 0.01 MM/MICROSEC.

TABLE I



94-23-1---2
MARBLE YULE

CALCITE(GRANULAR)   CA(C-O3)   100 PERCENT
PARTICLE SIZE .2 TO .4 MM,
A FEW GRAINS AS LARGE AS 1.5 MM

TO = 27 (+OR-) 3 DEGREES CENTIGRADE
VO = .3721 CC/G
VO1 = .3609 CC/G

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN MM/MICROSEC, AND PRESSURE IN KILOBARS.

TABLE

US1	UP1	P1	V1/VO	US2	UP2	P2	V2/VO
4.63	.396	49	.911				
4.21	.697	83	.841	3.537	.782	91	.814
5.73	.103	16	.967				
4.94	.796	104	.833	4.478	1.024	134	.787
				5.52	1.17	176	.785
				5.83	1.12	177	.803
				5.91	1.59	253	.728

US1 =

COMMENTS:

1) SOURCE: GREGSON, V.G., PETERSON, C.F. AND JAMIESON, J.C.
REPORT NO. AFCRL 63-662
STANFORD RESEARCH INSTITUTE, MENLO PARK, CALIFORNIA.
2) EXPERIMENTAL TECHNIQUE C
DATA REDUCTION TECHNIQUE B
3) ALL EXCEPT THE LAST TABLE ENTRY ARE COMPARATIVELY UNCERTAIN.
SOME OF THE ELASTIC WAVES INDICATED A SLOW RELAXATION EFFECT TO THE PLASTIC STATE.

TABLE 1

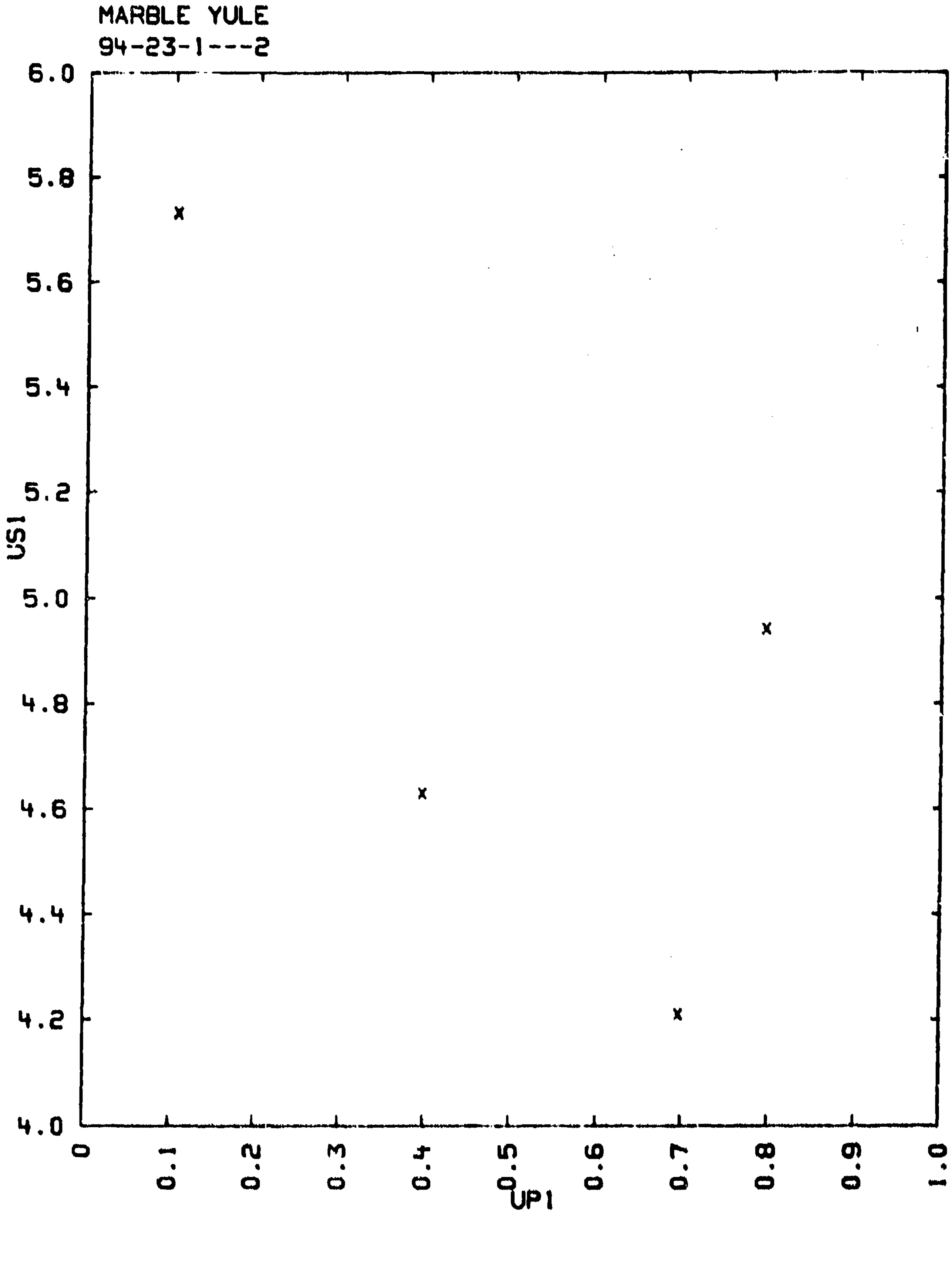
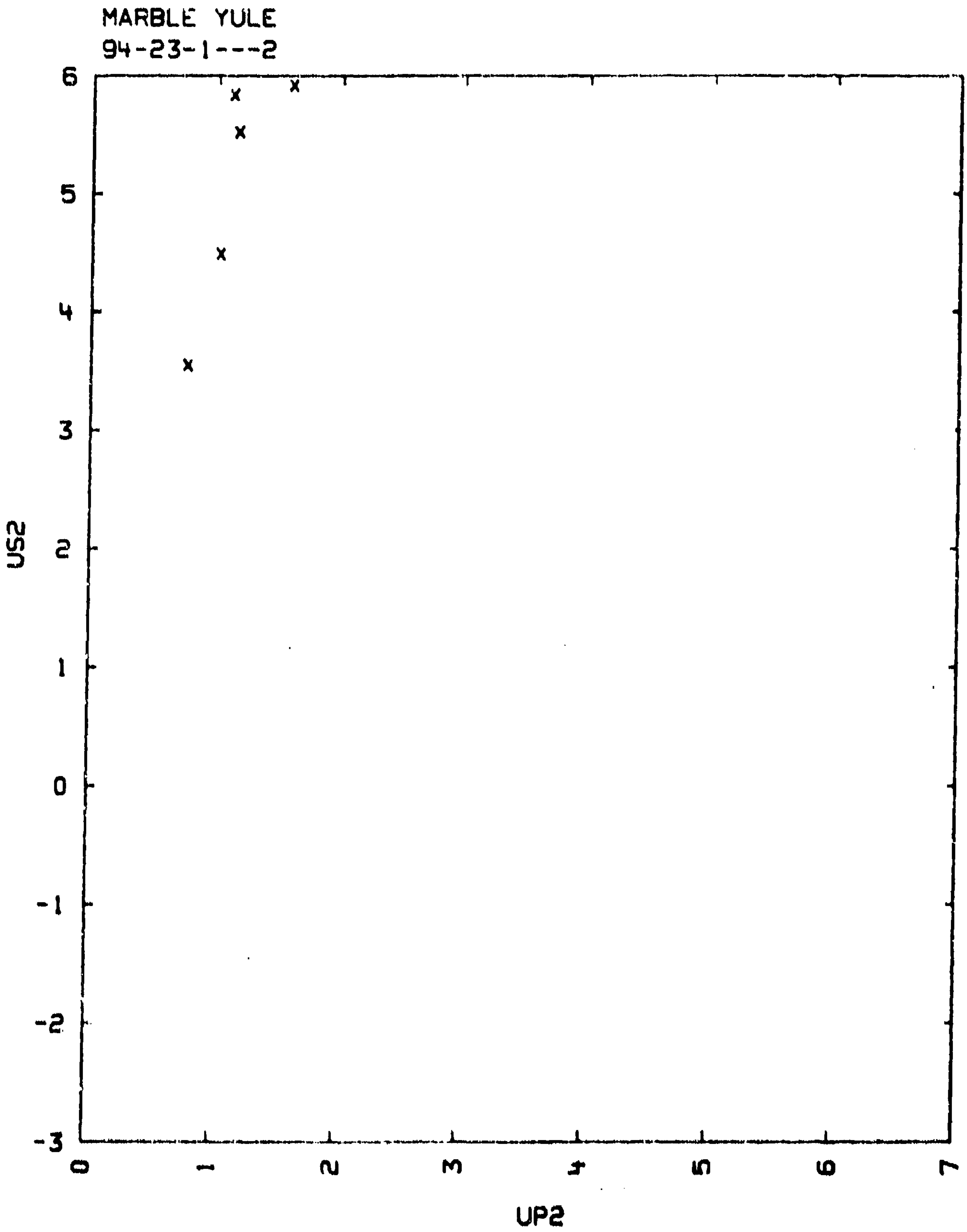

MARBLE YULE
94-23-1---2
6.0
5.8
5.6
5.4
5.2
5.0
4.8
4.6
4.4
4.2
4.0
US1
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
UP1

TABLE 1



94-23-1---3
LIMESTONE SOLENHOFEN

CALCITE	CA(C-O3)	96 PERCENT
CLAY		2 TO 3 PERCENT
QUARTZ	SI-O2	1 TO 2 PERCENT
POROSITY		0.2 TO 0.3 PERCENT
GRAIN SIZE	.005 TO .015 MM	

TO = 27 (+OR-) 3 DEGREES CENTIGRADE
VO = 0.387 CC/G

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN MM/MICROSEC, AND PRESSURE IN KILOBARS.

TABLE

US1	UP1	P1	V1/VO	US2	UP2	P2	V2/VO
5.330	.073	10	.987				
5.808	.108	13	.977				
3.585	.163	18	.961	3.094	0.441	42	.876
3.419	.223	24	.943				
3.342	.387	38	.844				
4.572	.820	97	.822	(1.238)	(3.666)	(134)	(.700)

US =

COMMENTS:

1) SOURCE: GREGSON, V.G., PETERSON, C.F. AND JAMIESON, J.C.
REPORT NO. AFCRL 63-662
STANFORD RESEARCH INSTITUTE, MENLO PARK, CALIFORNIA.
2) EXPERIMENTAL TECHNIQUE C
DATA REDUCTION TECHNIQUE B
THE ELASTIC WAVE (SUBSCRIPT 1) IS UNSTABLE AND SHOWS A STRONG STRAIN RATE DEPENDENCE.
3) THE VALUES IN PARENTHESES ARE UNCERTAIN RESULTS.

TABLE 1

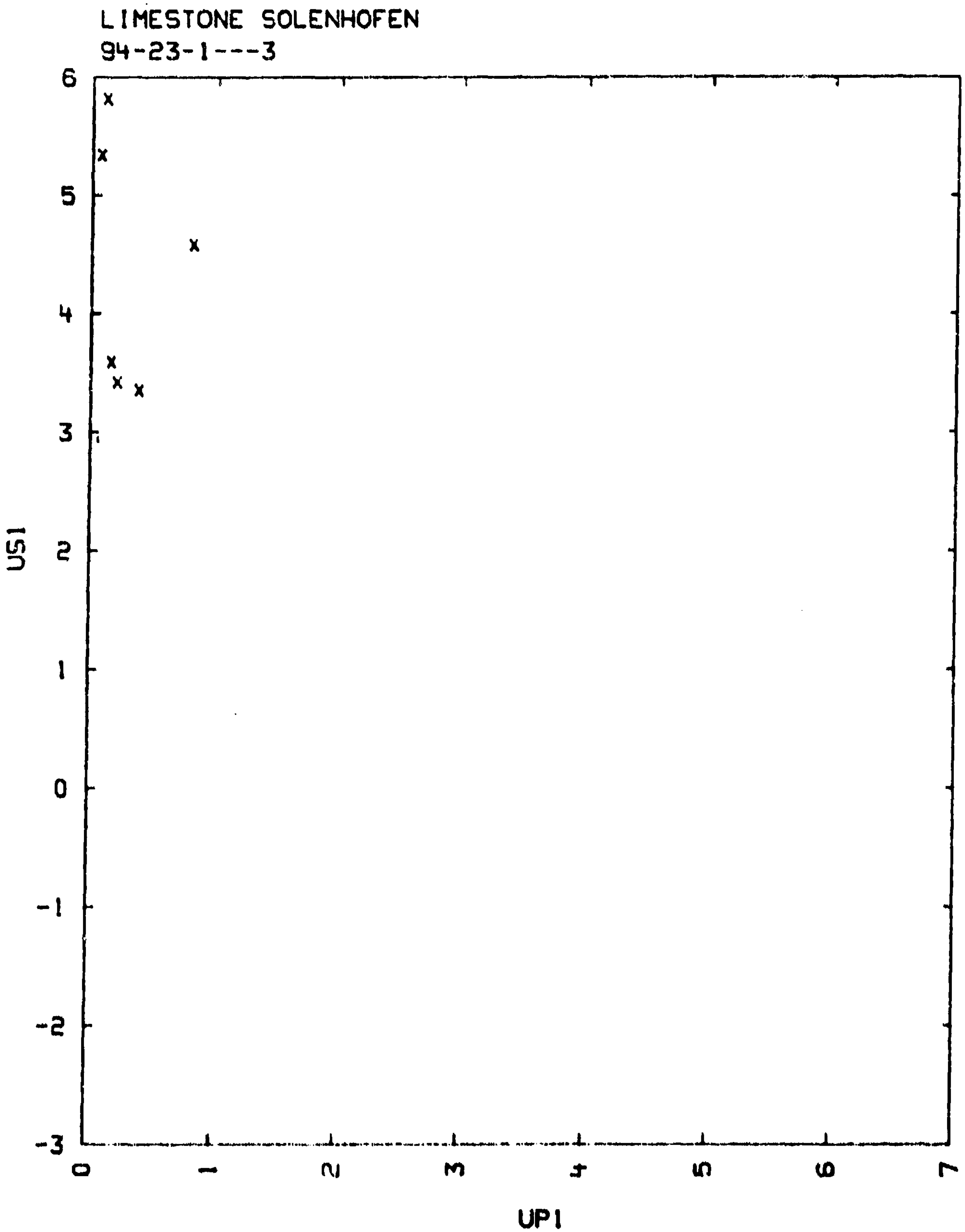
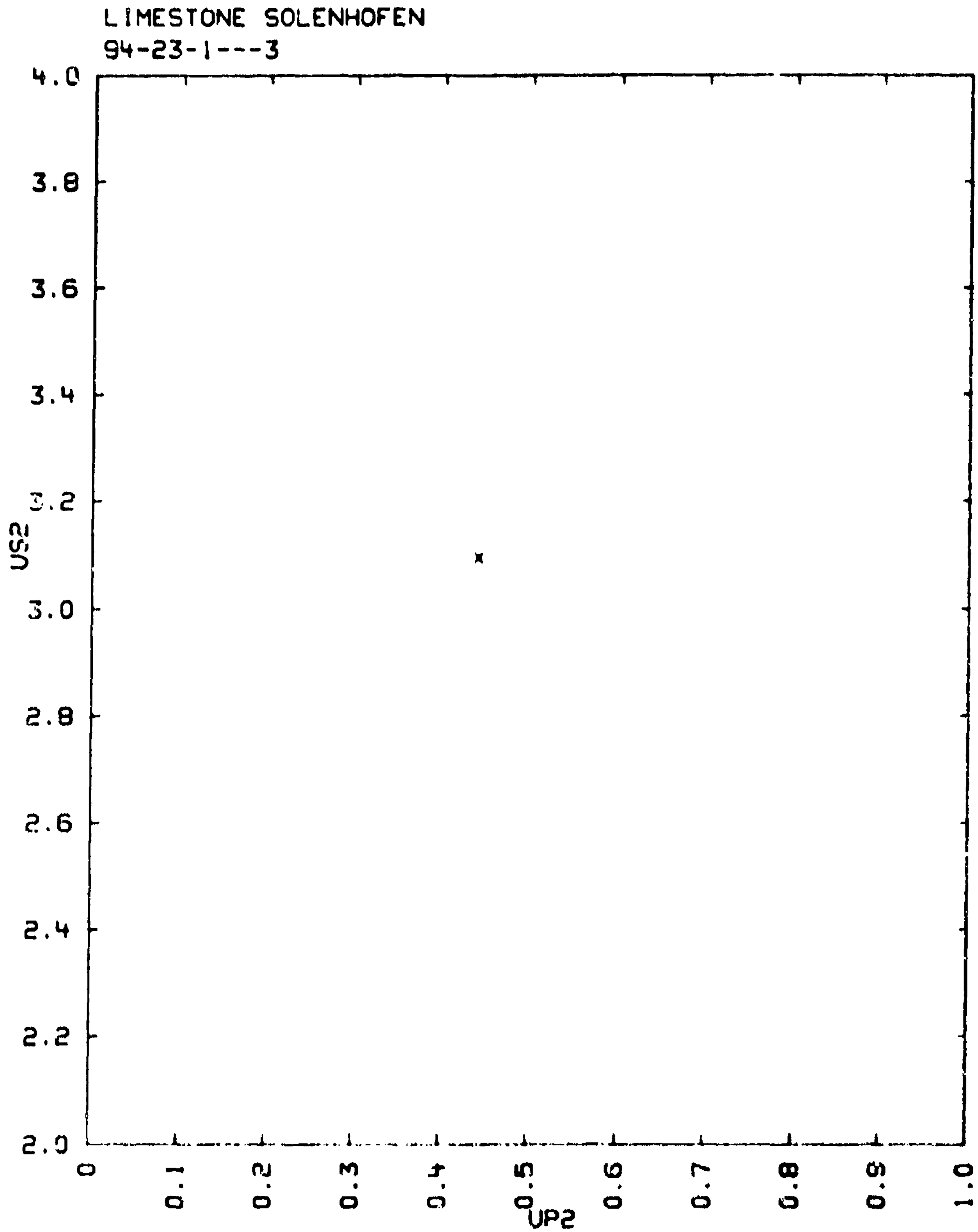


TABLE I



LIMESTONE SOLENHOFEN
94-23-1---3
4.0
3.8
3.6
3.4
3.2
3.0
2.8
2.6
2.4
2.2
2.0
US2
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
UP2

94-23-1---4
MARBLE VERMONT

CALCITE	CA1C-O3)	95 PERCENT,
QUARTZ	SI-O2	5 PERCENT,
GRAIN SIZE		.05 TO .2 MM

TO = 27 (+OR-) 3 DEGREES CENTIGRADE
VO = 0.372 CC/G
VO1 = 0.369 CC/G

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN MM/MICROSEC, AND PRESSURE IN KILOBARS.

TABLE

US1	UP1	P1	V1/VO	US2	UP2	P2	V2/VO
5.262	.086	12	.984				
4.300	.165	21	.965	3.791	.378	43	.909
4.718	.123	15	.973				
3.98	.190	23	.957				
3.73	.352	39	.914	3.284	.443	47	.884

US =

COMMENTS:

1) SOURCE. GREGSON, V.G., PETERSON, C.F. AND JAMIESON, J.C.
REPORT NO. AFCRL 63-662
STANFORD RESEARCH INSTITUTE, MENLO PARK, CALIFORNIA.
2) EXPERIMENTAL TECHNIQUE C
DATA REDUCTION TECHNIQUE B
3) THE QUARTZ IMPURITY OCCURRED IN ONE MM. BANDS THROUGHOUT THE SAMPLE.
4) THE PRESSURE ENTRY OF 23 KBARS IS IN A TRANSITION REGION BETWEEN TWO STATES AND CORRESPONDS TO AN UNSTEADY SHOCKWAVE.

TABLE 1

MARBLE VERMONT
94-23-1---4

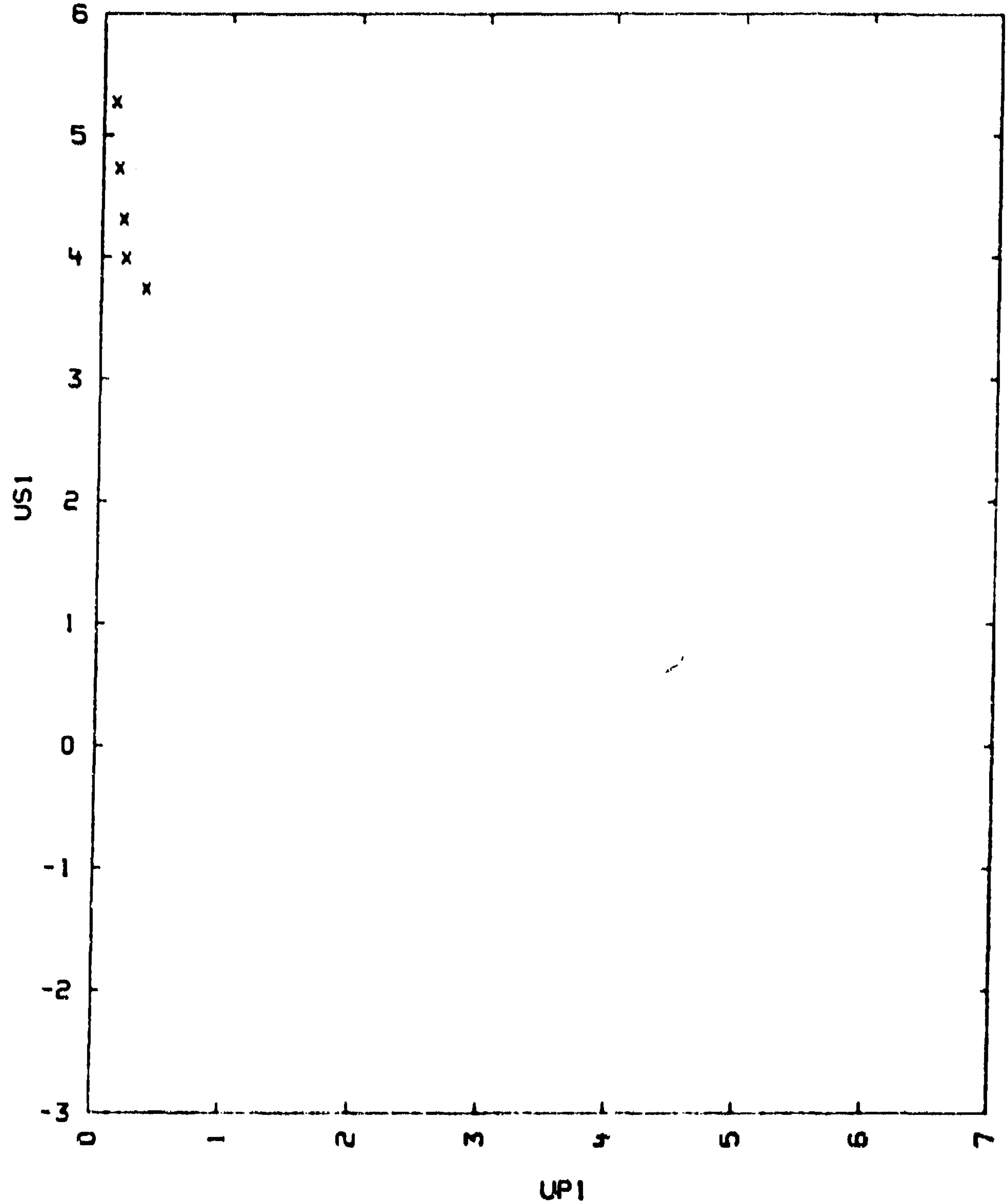
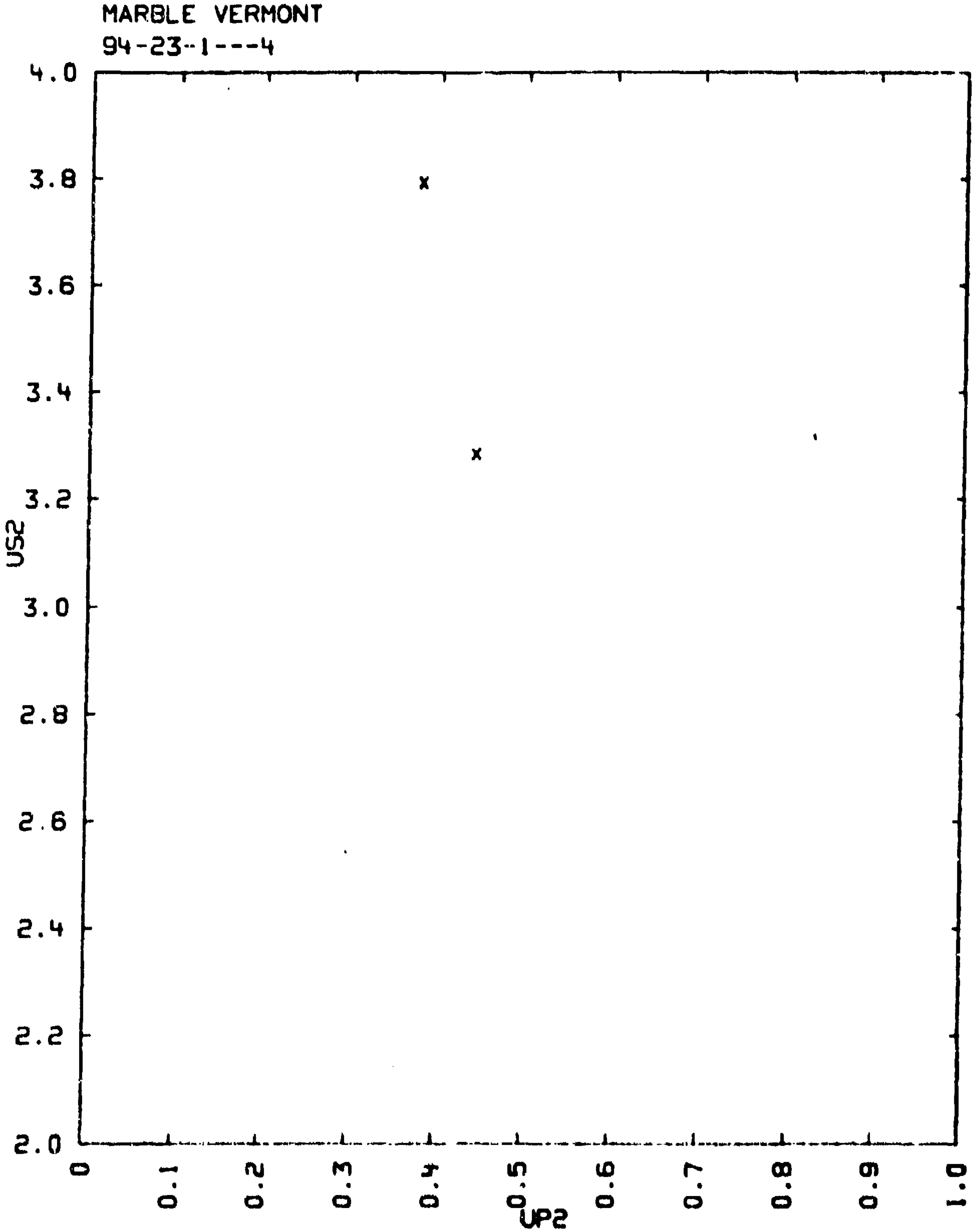


TABLE I


MARBLE VERMONT
94-23-1---4
US2
UP2
4.0
3.8
3.6
3.4
3.2
3.0
2.8
2.6
2.4
2.2
2.0
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0

94-23-1---5
CALCITE (ICELAND SPAR SINGLE CRYSTAL)

CA-C-03 100 PERCENT

V0 = 0.3689 CC/G CL(X-CUT)= 7.29 KM/SEC
V01= 0.3689 CC/G
CL(Y-CUT)= 7.35 KM/SEC

TABLE I LISTS THE SHOCK AND PARTICLE VELOCITIES OF VARIOUS SHOCK-FRONTS OBSERVED IN EACH EXPERIMENT. THE CRYSTAL CUT AND SHOCK FRONTS ARE PERPENDICULAR TO THE AXIS SHOWN IN COLLUMN 2. CLE INDICATES THE NATURAL CLEAVAGE PLANE. ALL VELOCITIES ARE LABORATORY COORDINATES. UNITS ARE KM/SEC. SAMPLE THICKNES D IS IN MM

TABLE I

SAMPLE											HOLDER
NO	CUT	D	US1	UP1	US2	UP2	US3	UP3	US4	UP4	UFS
1	CLE	10.066	7.13	0.081	5.04	0.134	3.86	0.195			1.1741
2	CLE	-	7.134	0.1144	3.952	0.2694					1.1520
3	CLE	9.245	7.068	0.0971	5.02	0.3331	4.639	0.6746			2.1754
4	X	6.224	6.852	0.1050	4.227	0.2173	3.605	0.3073			1.2824
5	X	6.274	6.886	0.1089	4.441	0.2280	3.572	0.3433			1.377
6	X	6.096	7.041	0.1065	4.38	0.209	3.76	0.328	3.16	0.361	1.3823
7	X	6.121	6.788	0.1248	4.698	0.6817					2.499
8	X	5.215	7.40	0.132	5.24	0.346	4.42	0.664			
9	X	6.096	6.955	0.1202	4.740	0.6813	4.001	0.7702			1.478
10	X	6.322	6.493	1.3948							3.3187
A	X		7.363	0.13	6.283	1.54					.
B	X		7.277	-	6.163	1.48					
C	X		-	-	6.675	1.86					
11	Y	5.944	6.636	0.1179	4.33	0.185	3.33	0.284	2.86	0.331	1.438
12	Y	5.994	6.955	0.1352	4.290	0.2219	3.685	0.3180			1.2408
13	Y	6.198	7.082	0.1412	4.582	0.6874					2.555
14	Y	5.967	7.044	0.1102	4.788	0.6137	4.336	0.7486			1.5377
15	Y	6.015	7.122	0.1448	4.765	0.5536	4.390	0.7481			1.4618
16	Y	6.175	6.206	1.4773							3.261
D	Y		7.45	0.12	6.06	1.435					
E	Y		-	-	6.630	1.77					
17	Z	8.001	5.451	0.1293	4.146	0.2357	3.682	0.3480	3.184	0.4051	1.4079
18	Z	8.001	5.407	0.1231	4.222	0.2210	3.591	0.3499			1.4422
19	Z	7.838	5.752	0.1188	5.13	0.586					2.3919
20	Z	11.024	5.384	0.206	4.652	0.7312					1.482
21	Z	17.366	5.758	0.1026	4.807	0.8368					1.4952
22	Z	6.091	5.563	0.1393	4.822	0.7892	4.051	0.8651			1.4087
23	Z	7.838			5.13	0.900					2.3980
24	Z	11.024			4.98	0.853	4.72	1.04			1.3998
25	Z	5.931	5.981	1.5135							
F	Z		6.09	1.47							
G	Z		6.702	1.87							

CALCITE (ICELAND SPAR SINGLE CRYSTAL)

NO CUT D US1 UP1 US2 UP2 US3 UP3 US4 UP4 UFS

US1 =

TABLE II LISTS PRESSURE IN KILOBARS AND VOLUME IN CC/G OF THE SAMPLES BEHIND THE ABOVE SHOCK FRONTS 1 THROUGH 4. THE LAST TWO COLUMNS GIVE THE PRESSURE AND MATERIALS OF THE SAMPLE HOLDERS. THESE ARE 12.5 MM PLATES OF FE = MILD STEEL, CH = LUCITE, AL = ALUMINUM, BR = BRASS

TABLE II

- - - - - - - - - - - - - SAMPLE								- - - - - - - - - - - - - -	- HOLDER -	
NO	P1	V1	P2	V2	P3	V3	P4	V4	MTRL	P
1	16.	0.365	23	0.362	29	0.356			FE + CH	25
2	22.1	0.3630	38.5	0.3483					FE + CH	24.5
3	18.6	0.3638	50	0.346	86.8	0.3229			CH	55
A	25.9	0.3624	265.	0.279						
B	25.6	0.3523	247.	0.282						
C	-	-	338.	0.266						
4	19.5	0.3632	32.3	0.3533	40.9	0.3439			FE + CH	27
5	20.3	0.3630	34.6	0.3531	45.5	0.3409			FE + CH	25
6	20.3	0.3633	32	0.354	44	0.343	47	0.339	BR + CH	30
7	23.0	0.3621	93.3	0.3180					CH	67
8	26	0.362	57	0.347	94	0.320			AL	
9	22.7	0.3625	94.2	0.3185	103.4	0.2997			AL	130
10	245.5	0.2898							AL	349
11	21.2	0.3623	29	0.357	38	0.345	41	0.338	BR + CH	32
12	25.5	0.3619	35.4	0.3542	44.8	0.3444			FE + CH	27
13	27.1	0.3615	94.2	0.3170					CH	69
14	21.0	0.3631	85.9	0.3240	101.4	0.3123			AL	136
15	20.0	0.3614	80.2	0.3294	102.9	0.3127			AL	129
16	247.9	0.2813							AL	342
D	24.2	0.3630	239.	0.283						
E	-	-	320.	0.271						
17	19.1	0.3601	31.0	0.3506	42.0	0.3391	46.7	0.3323	FE + CH	31
18	18.0	0.3605	29.2	0.3519	41.9	0.3384			FE + CH	32
19	18.5	0.3612	83	0.328					CH	63
20	30	0.3548	95.9	0.3128					AL	130
21	18.0	0.3623	111.3	0.3058					AL	132
22	21.0	0.3598	105.6	0.3097	113.6	0.3025			AL	125
23			126.	0.3049					CH	63
24			115.	0.305	139	0.290			AL	122.5
25	246.0	0.2749							AL	
F	243.	0.280								
G	340.	0.266								

THE ABOVE DATA SUGGEST THE FOLLOWING PHASE TRANSITION POINTS ON THE HUGONIOT. THE BRACKETED VALUES INDICATE A LESS CLEAR CUT OBSERVATION.

TABLE III

	HUGONIOT ELASTIC LIMIT		1ST TRANSITION		2ND TRANSITION		3RD TRANSITION	
CUT	P1	V1	P2	V2	P3	V3	P4	V4
CLE	18.8	0.383			(50.5)	(0.348)		
2	18.5	0.380	30.1	0.351	41.9	0.339	99.9	0.307
X	21.2	0.383	33.1	0.354	(50.4)	(0.345)	94.2	0.318
Y	23.7	0.382	32.2	0.354	(37.8)	(0.345)	83.1	0.327

COMMENTS:

1) SOURCE: GREGSON V. G., PETERSEN C. F. AND JAMIESON J. C.
REPORT NO: SRI-PGU-3630-STR-3 (1962)
POULTER LABORATORIES
MENLO PARK, CALIFORNIA
ALSO: AHRENS T.J.AND GREGSON V.G. J. GEOPHYS. RES. NO64 P.4839 1964
AHRENS T.J., ROSENBERG J.T. AND RUDERMAN M.H.(ENTRY A TO G)
DYNAMIC PROPERTIES OF ROCKS
PROJECT FGU-4816 REPORT DASA 1868 (SEPT.30 1966)
STANFORD RES. INST., MENLO PARK, CALIF., U.S.A.

2) EXPERIMENTAL TECHNIQUE C1
DATA REDUCTION METHOD B(IN ENTRIES A,B,C,E AND G) AND D(FOR THE REST)

3) V01 WAS OBTAINED FROM X RAY RESULTS OF SYNTHETIC CALCITE AT 18 DEGREE CENTIGRADE: A = 4.9898 AND C = 17.060 ANGSTROM WITH 6 MOLECULES IN THE HEXAGONAL UNIT CELL.
ANDREWS STRUCTURE REPORTS VOL. XIII, PAGE 295, (1950)

4) THE FIRST SHOCK IN ENTRY 21 WAS ASSUMED TO BE THAT OF ENTRY 10 AND THE FIRST SHOCK IN ENTRY 22 WAS ASSUMED TO BE THAT OF ENTRY 15
ALSO ASSUMED WERE UP1 OF ENTRIES A THROUGH C AND E ; US1 OF C,E,F AND G; UNCERTAINTIES IN THESE LATTER ASSUMPTIONS AFFECT P,V VALUES NEGLI-GEBLY.

5) UFS VALUES OF A B C E AND G (2.94 2.90 3.46 AND 3.74 KM/SEC RESP.) INDICATE RAPID PHASE REVERSAL TO THE ORIGINAL LOW PRESSURE PHASE, SINCE 0.5UFS IS CLOSE TO UP MAX.

6) A VALUE OF 14 KBAR FOR THE FIRST PHASE CHANGE IS INDICATED BY ULTRA-SONIC MEASUREMENTS ON YAMATGUCHI MARBLE (SHOJI KONDO ET.AL. J.PHYS. EARTH V.20 P.245 (1972))

7) CL VALUES FROM PESELNICK AND ROBIE, J. APPL. PHYS. VOL. 34, 2494 (1963).

TABLE I

CALCITE (ICELAND SPAR SINGLE CRYSTAL)

94-23-1---5

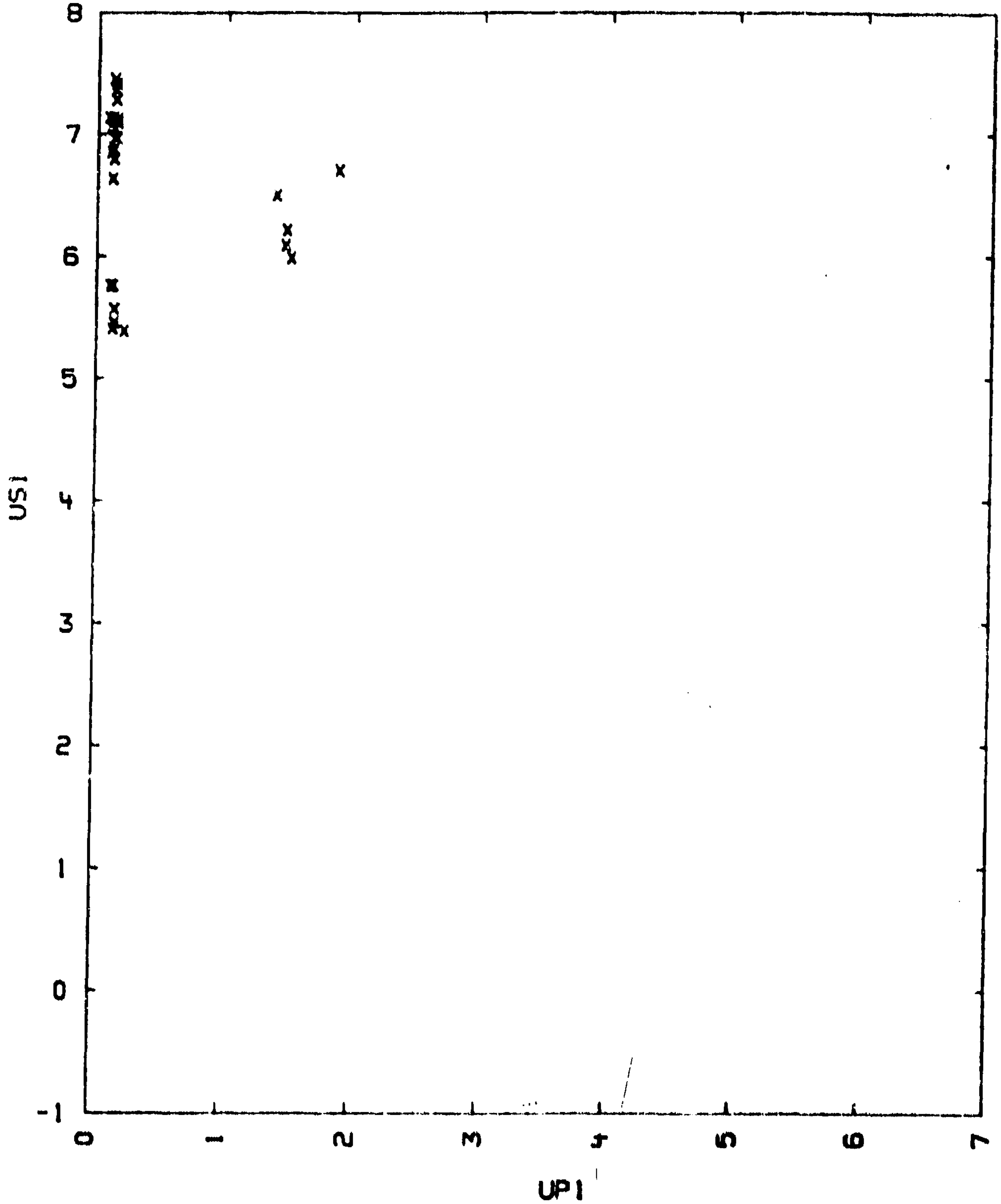


TABLE I

CALCITE (ICELAND SPAR SINGLE CRYSTAL)

94-23-1---5

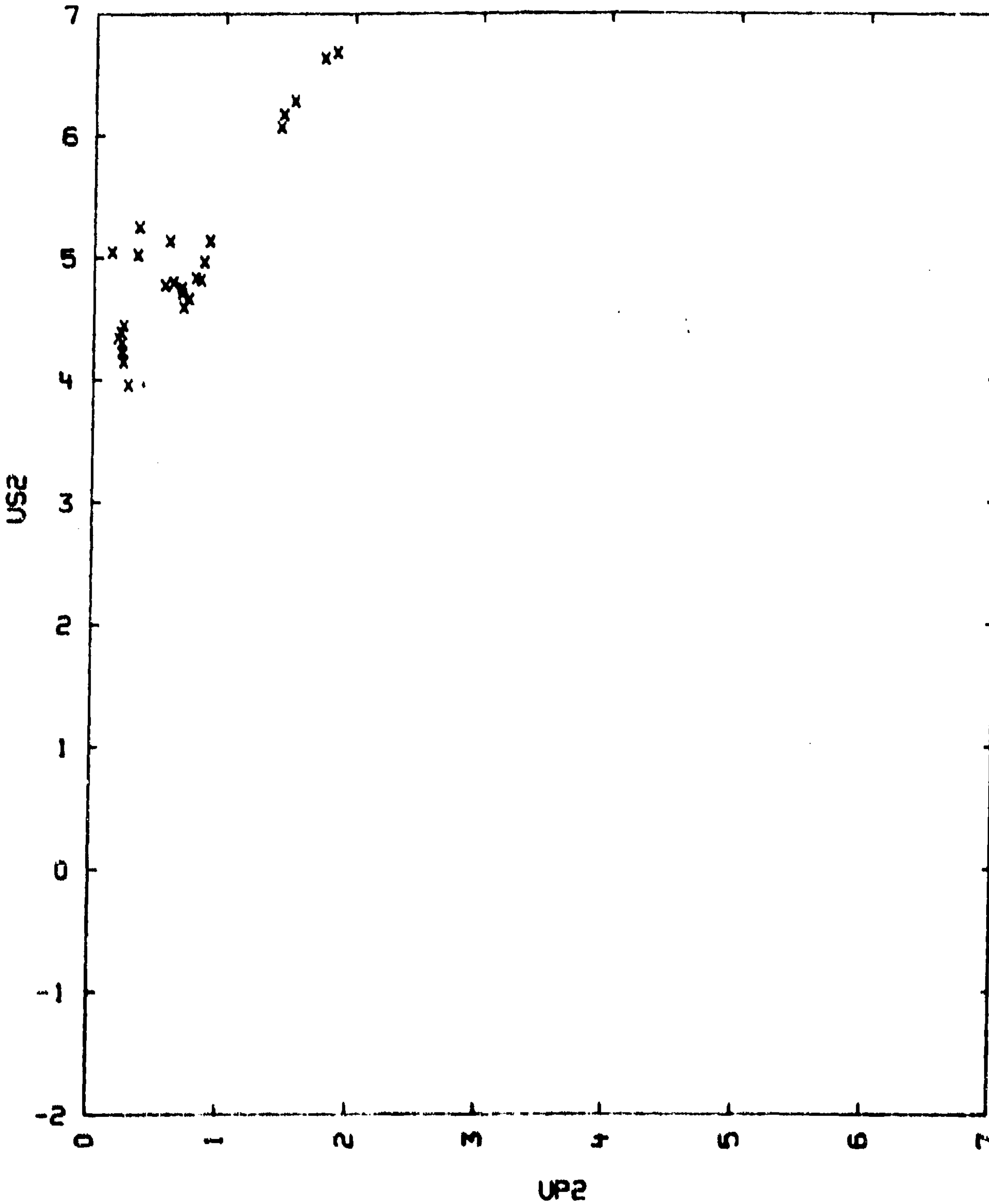


TABLE I

CALCITE (ICELAND SPAR SINGLE CRYSTAL)

94-23-1---5

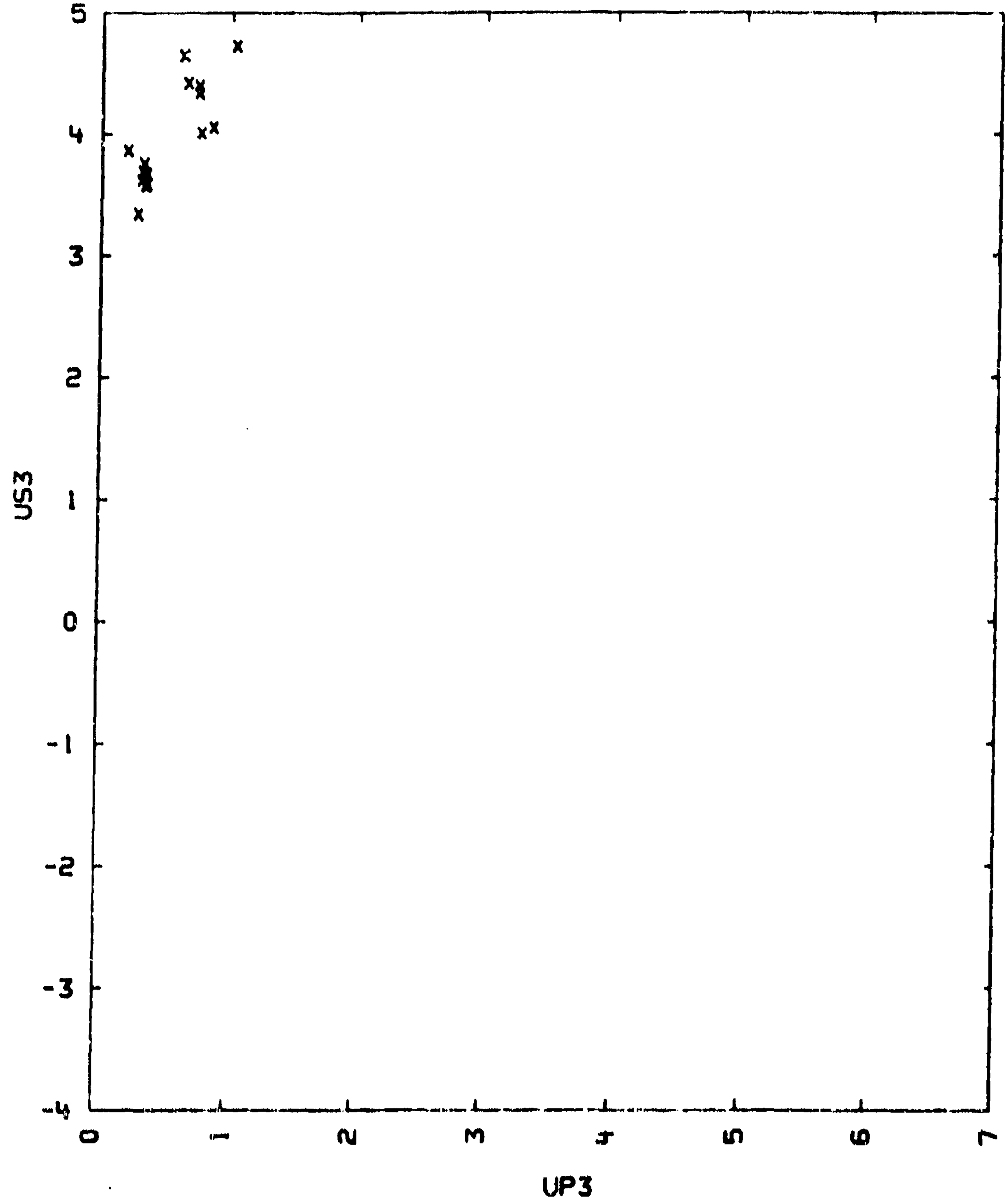
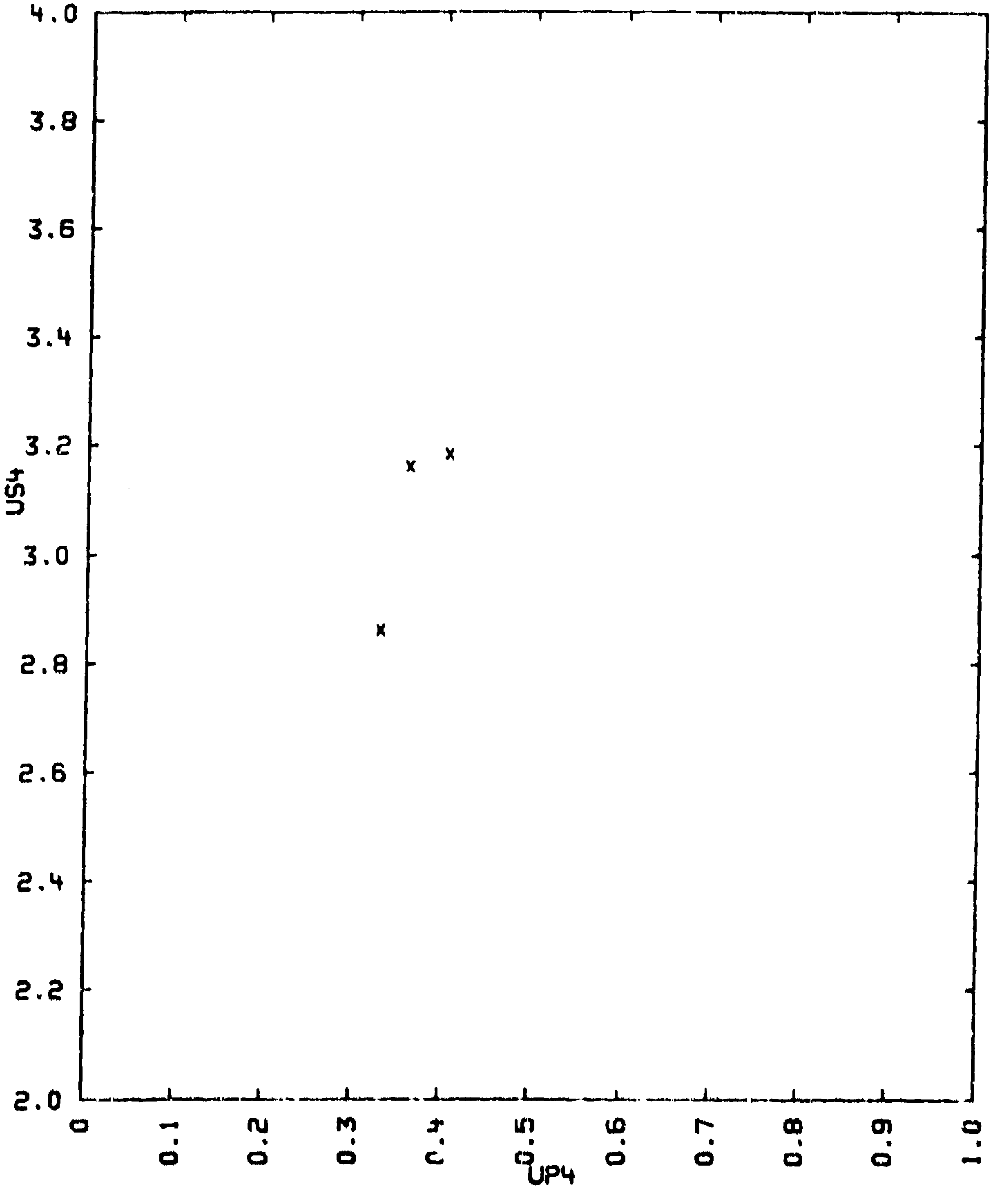


TABLE 1

CALCITE (ICELAND SPAR SINGLE CRYSTAL)

94-23-1---5



94-23-1---6
LIMESTONE SOLENHOFEN

CALCITE CA(C-O3) 100 PERCENT
AVERAGE GRAIN SIZE 0.01 MM
MAXIMUM GRAIN SIZE 0.02 MM

V0 = 0.3869 CC/G CL = 5.30 KM/SEC
CS = 2.89 KM/SEC

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN MM/MICROSEC, AND PRESSURE IN KILOBARS.

TABLE

RHO0	US	UFS	UP	P	V/V0
2.590	4.33	1.30	0.69	78	0.841
2.597	5.33	2.25	1.17	162	0.781
2.597	5.27	2.22	1.18	161	0.776
2.598	5.69	2.82	1.48	218	0.740
2.594	5.67	2.81	1.50	220	0.735
2.560	6.41	3.87	2.11	347	0.670
2.566	5.72	3.12	1.63	240	0.715
2.573	9.04	7.37	3.87	900	0.572

US =

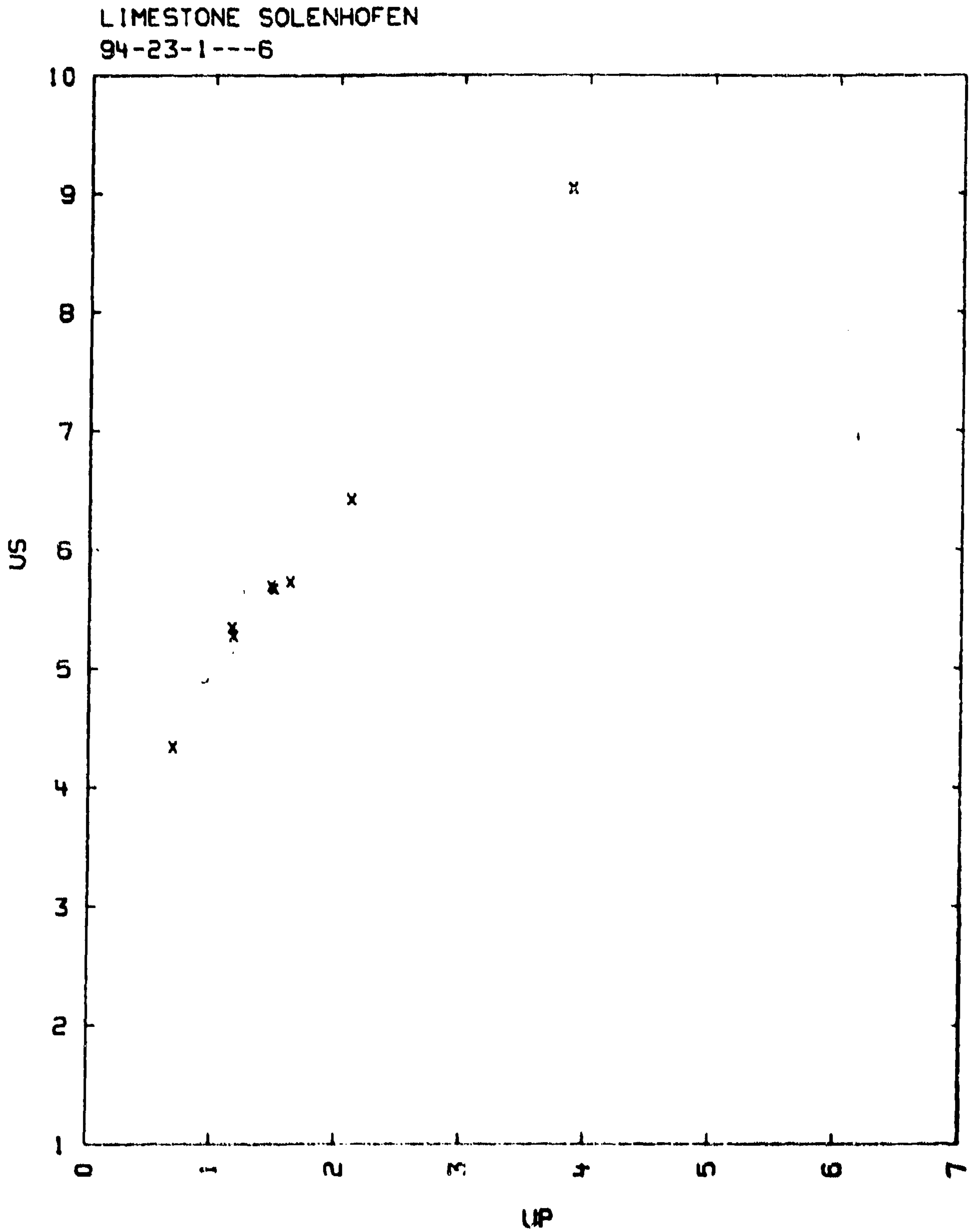
COMMENTS:

1) SOURCE: COMPILER
L.R.L. EQUATION OF STATE FILE (1965)
LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION TECHNIQUE B
STANDARD MATERIAL 2024 ALUMINUM
3) CHEMICAL ANALYSIS: C-O3 56.7 PERCENT
CA 37.82 PERCENT
MG LESS THAN 0.5 PERCENT
FE 0.02 PERCENT
SI 0.62 PERCENT
AL 0.15 PERCENT (SPECTROGRAPH)
THE CHEMICAL ANALYSIS INDICATES THAT CALCIUM CARBONATE ACCOUNTS FOR APPROXIMATELY 95-97 PERCENT OF THE SAMPLE IF SI EXISTS AS SI-O4.
4) ANOTHER SOLENHOFEN SAMPLE WITH A RHO0 = 2.656 G/CC. YIELDED HIGHER SOUND VELOCITIES. D. S. HUGHES AND C. MAURETTE, REVUE DE LINSTITUT FRANSAUS DU PETROL ET ANNALES DES COMBUSTIBLES LIQUIDES, VOL. XII, P. 730, (1957)

P =	1.	100	250	500	1000	1500	2000	3000	4000	5000 BARS
CL =	5.97	6.00	6.01	6.02	6.05	6.06	6.08	6.11	6.12	6.13
CS =	2.88	2.95	2.98	2.99	3.01	3.01	3.02	3.02	3.05	3.04

ALL VELOCITIES IN KM/SEC.

TABLE I



94-23-1---7
LIMESTONE (CALCIUM CARBONATE)

CA-C-03	98.2	PERCENT BY WEIGHT
H2-O	0.03	- - -
MG	0.20	- - -
SI-02	0.62	- - -
MN	0.02	- - -
FE	0.07	- - -
P	0.22	- - - (AS P-04)
SR	TRACE	
CL	-	
CU	-	
TI	-	
NA	-	
K	-	
VOIDS	35	PERCENT BY VOLUME

VO = 0.574 G/CC.
VOI = 0.3689 G/CC.

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC., VELOCITY IN KM/SEC., AND PRESSURE IN KILOBARS.

TABLE

RHOO	US	UP	P	V/VO
1.75	1.59	0.58	16	0.635
-	1.53	0.56	15	0.634
-	1.90	0.81	27	0.574
-	1.97	0.79	27	0.599
-	2.97	1.04	54	0.650
-	2.76	1.14	55	0.587
-	4.00	1.52	106	0.620
-	4.23	1.51	112	0.643
-	4.12	1.67	120	0.595
-	4.38	1.67	128	0.619
-	4.35	1.74	132	0.600
-	4.70	2.28	187	0.515
-	4.06	2.34	199	0.516
-	5.84	3.14	321	0.462
-	6.22	3.26	355	0.476
-	6.67	3.54	413	0.469
-	6.67	3.60	444	0.430

US = 0.587 + 1.240 UP + 0.718 UP**2 KM/SEC. SIGMA US = 0.20 KM/SEC.
FOR UP FROM 0.58 TO 1.52 KM/SEC.
US = 2.151 + 1.214 UP KM/SEC. SIGMA US = 0.17 KM/SEC.
FOR UP FROM 1.6 TO 3.8 KM/SEC.

COMMENTS:

1) SOURCE: HART AND SKIDMORE I. C.

PRIVATE COMMUNICATIONS (1965)
BERKSHIRE, ENGLAND.
ATOMIC WEAPONS RESEARCH ESTABLISHMENT, ALDERMASTON.

2) EXPERIMENTAL TECHNIQUE A.
DATA REDUCTION TECHNIQUE B.
ALUMINUM, IRON, AND STEEL WERE USED AS STANDARDS.

3) THE POROSITY WAS DETERMINED BY ASSUMING THE SAMPLES TO BE PURE CALCIUM CARBONATE AND TAKING A CRYSTAL DENSITY OF 2.71 G/CC.

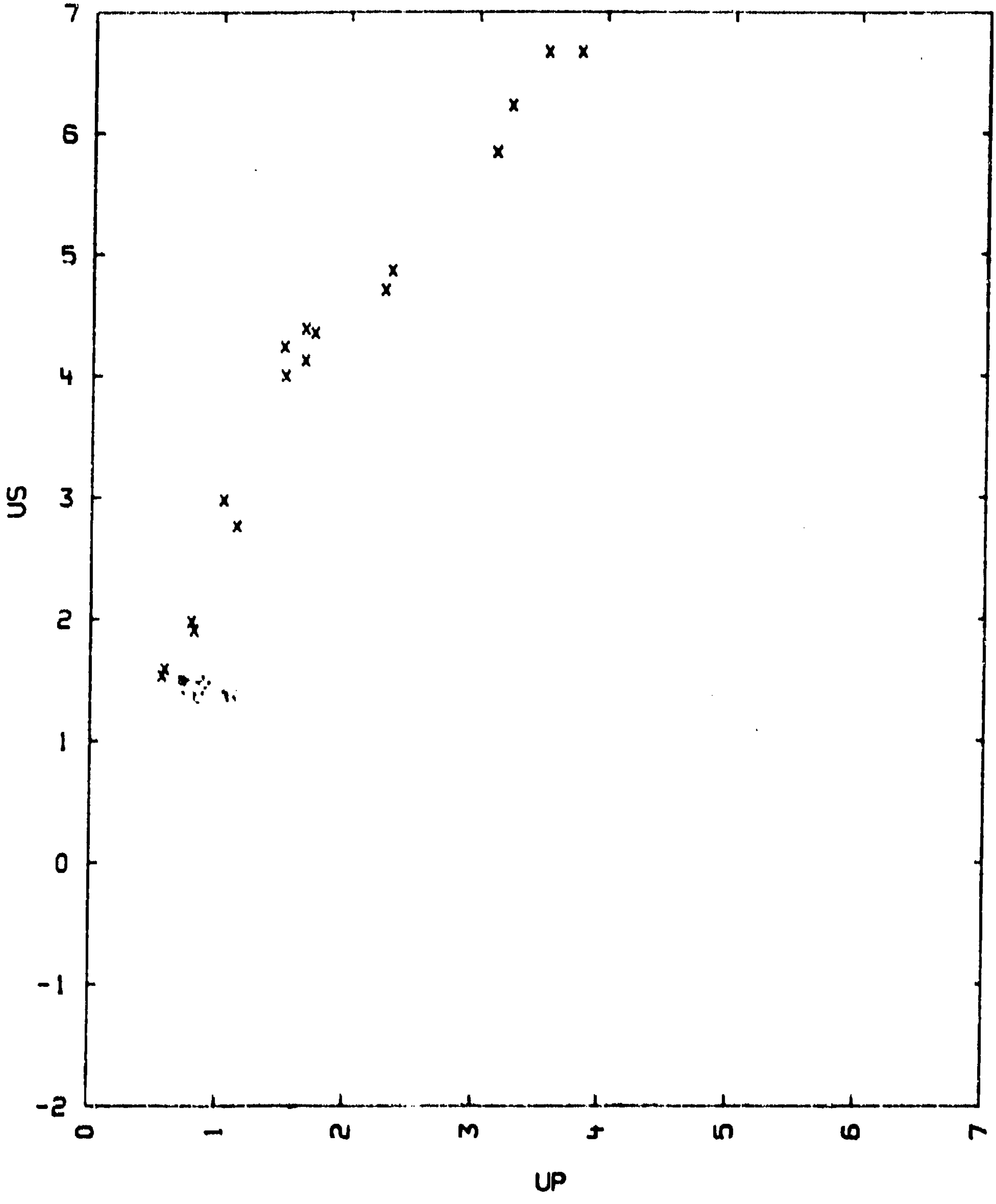
4) V01 WAS CALCULATED FOR PURE CALCIUM CARBONATE USING THE LATTICE CONSTANTS, A = 4.9898 AND C = 17.060 ANGSTROMS AT 18 DEG. CENTIGRADE FOR A HEXAGONAL CELL.
A.C.A. MONGRAPH NUMBER 5 (AMERICAN CRYSTALLOGRAPHIC ASSOCIATION, POLYCRYSTAL BOOK SERVICE, BROOKLYN, N.Y., 1963) 2ND ED.

5) THE SAMPLES WERE OBTAINED FROM THE SALISBURY PLAIN.

6) ANOTHER FIT OF THE LOW PRESSURE DATA USING OTHER THEORETICAL CONSIDERATIONS IS: UP = (0.384 US)/(1 - 0.0003 US**2) KM/SEC.
NO PHYSICAL SIGNIFICANCE IS ATTACHED TO THE DISCONTINUITY AT UP = 1.52 KM/SEC.

TABLE I

LIMESTONE (CALCIUM CARBONATE)
94-23-1---7



94-23-1---8
LIMESTONE

CALCITE	CA-C-O3	98. -98.	WT. PERCENT
MAGNESIUM CARBONATE	MG-C-O3	2.6- 0.4	- -
WATER	H2-O	REST	- -
MANGANESE CARBONATE	MN-C-O3	-	- -
IRON CARBONATE	FE-C-O3	-	- -
ORGANICS		-	- -

VO = 0.370 CC/G.
VOI= 0.

THE TABLE LISTS DENSITY IN G/CC., VELOCITIES IN KM/SEC. AND PRESSURE IN KBAR.

TABLE

RHOO	US	UP	P	V/VO
2.70	12.59	5.82	1977.	0.538
-	10.22	4.41	1214.	0.570
-	10.16	4.23	1159.	0.583
-	9.38	3.93	995.	0.583
-	8.07	3.29	717.	0.591
-	6.72	1.99	361.	0.704
-	5.23	1.04	147.	0.801

US = 3.51 + 1.53*UP KM/SEC.
SIG US = 0.26 KM/SEC.

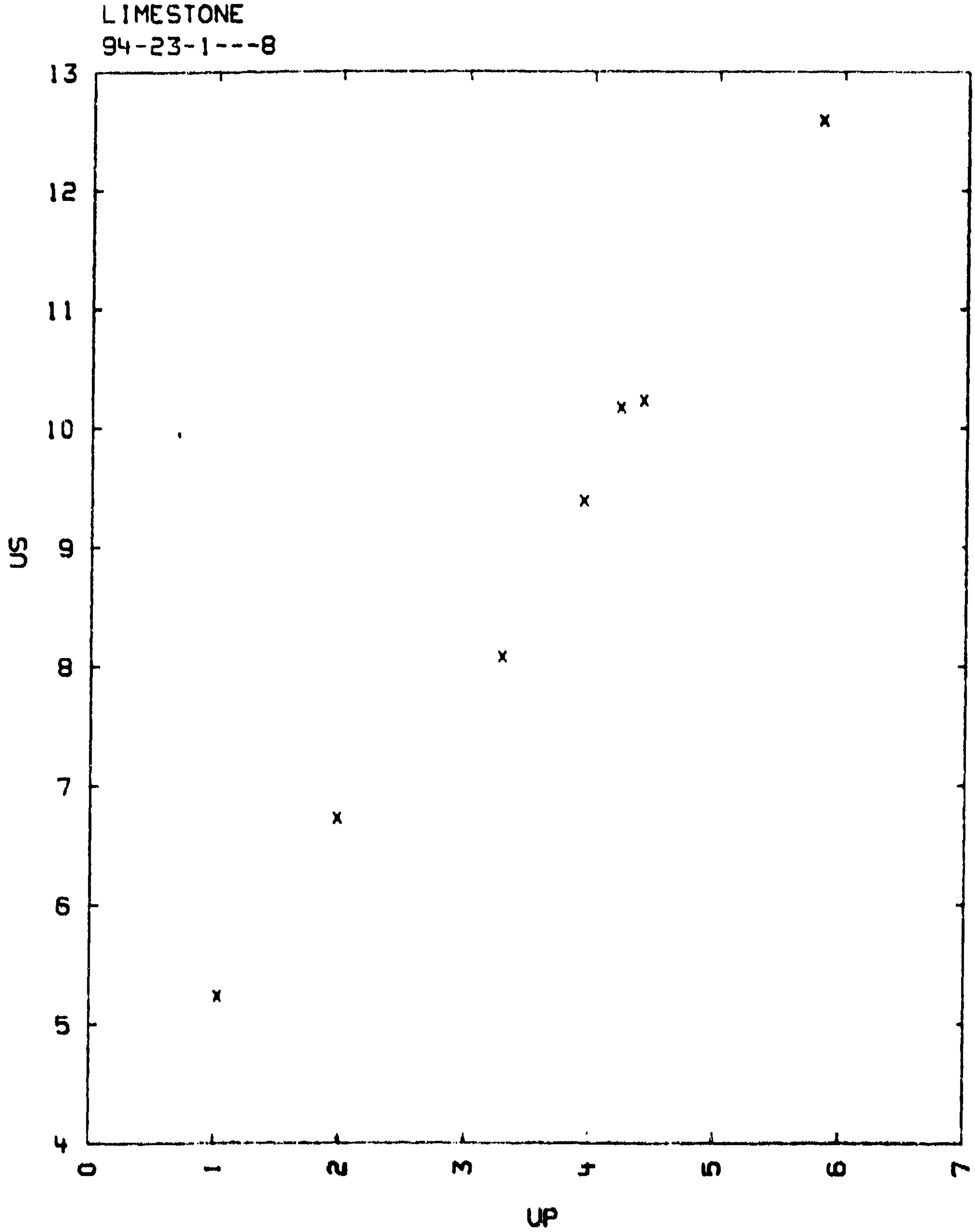
COMMENTS:

1) SOURCE: ISBELL W. M., SHIPMAN F. H. AND JONES A. H.
PRIVATE COMMUNICATION
CONTRACT DA-49-146-XZ-429
GENERAL MOTORS TECHNICAL CENTER, WARREN, MICH., U.S.A.

2) EXPERIMENTAL TECHNIQUE: A. THE PROJECTILE (FANSTEEL OR HIGH PURITY COPPER) VELOCITIES WERE DETERMINED BY TWO TIMED X-RAY FLASHES.
DATA REDUCTION METHOD: A

3) THE COMPOSITION OF THESE SAMPLES PROBABLY VARIES LESS THAN INDICATED ABOVE, SINCE THE SAMPLES WERE OBTAINED FROM UNIFORM PORTIONS OF A CORE FROM A PARTICULAR DEPTH, WHILE THE ANALYSIS REPRESENTS THE VARIATION ACROSS THE LIMESTONE STRATUM FROM WHICH THE SAMPLES WERE OBTAINED.
SEE:F. M. BYERS JR., T. BOTINELLY AND H. BARNES
TECHNICAL LETTER NTS-24 (1962)
U. S. GEOLOGICAL SURVEY, FEDERAL CENTER, DENVER 25, COLORADO, U.S.A.

TABLE I



94-93-23-1---1
DOLOMITE

DOLOMITE	CA-MG-(C-03)2	96.4	WT.	PERCENT
LIMESTONE	CA-C-03	1.	-	-
QUARTZ	SI-02	1.8	-	-
CLAY	(AL,FE,O,SI,H)	1.7	-	-
GOETITE	FE2-03-(H2-0)	.2	-	-

V0 = 0.3539 CC/G   C0 = 5.91 KM/SEC.
V01= 0.350 CC/G

THE TABLE LISTS DENSITY IN G/CC., VELOCITIES IN KM/SEC. AND PRESSURE IN KBAR.

TABLE

------- SAMPLE					---------	STANDARD
RHOO	US	UFS	UP	P	V/V0	P
2.831	7.03	2.35	1.17	233.	0.834	231.
2.820	7.45	3.58	1.79	378.	0.760	381.
2.829	8.07	4.86	2.38	543.	0.705	553.
2.824	8.75	6.09	3.14	776.	0.641	804.
2.822	6.92	2.33	1.12	219.	0.838	218.
2.825	6.68	1.69	0.813	153.	0.878	151.
2.824	6.44	0.987	0.495	90.	0.923	85.

US = 5.97 + 0.876*UP KM/SEC.
SIG.US= 0.05 KM/SEC.

COMMENTS:

1) SOURCE: HORD B. L. AND COMPILER
L.R.L. EQUATION OF STATE FILE
LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIF. 94550, U.S.A
2) EXPERIMENTAL TECHNIQUE: B
DATA REDUCTION TECHNIQUE: B, STANDARD MATERIAL AL.
3) V01 IS THE SUM OF THE VOLUMES OF THE COMPONENTS, DEVIDED BY THE TOTAL WEIGHT. THE V01 VALUES OF SI-02 AND CA-C-03 WERE COMBINED WITH THAT OF PURE DOLOMITE: R. W. G. WYCKOFF, CRYSTAL STRUCTURES (INTERSCIENCE PUBLISHERS 1964) VOL. 2, 2ND ED. V01(CA-MG-C2-06)= 0.3489 CC/G FOR MONTMORILLINITE CLAY AND GOETITE SPECIFIC VOLUMES USED WERE 0.40 AND 0.229 CC/G RESP.
4) THESE SAMPLES WERE OBTAINED FROM DEPTHS OF 1308 TO 1341 FOOT IN A HOLE DESIGNATED U10B AT THE APPROXIMATE NEVADA CENTRAL COORDINATES N. 880,000 - E. 670,000.
5) AN AVERAGE ANALYSIS OVER THE DEPTH RANGE 1303 TO 1346 FEET (F. STEPHENS, THIS LABORATORY) YIELDED THE FOLLOWING WT. PERCENTAGES.

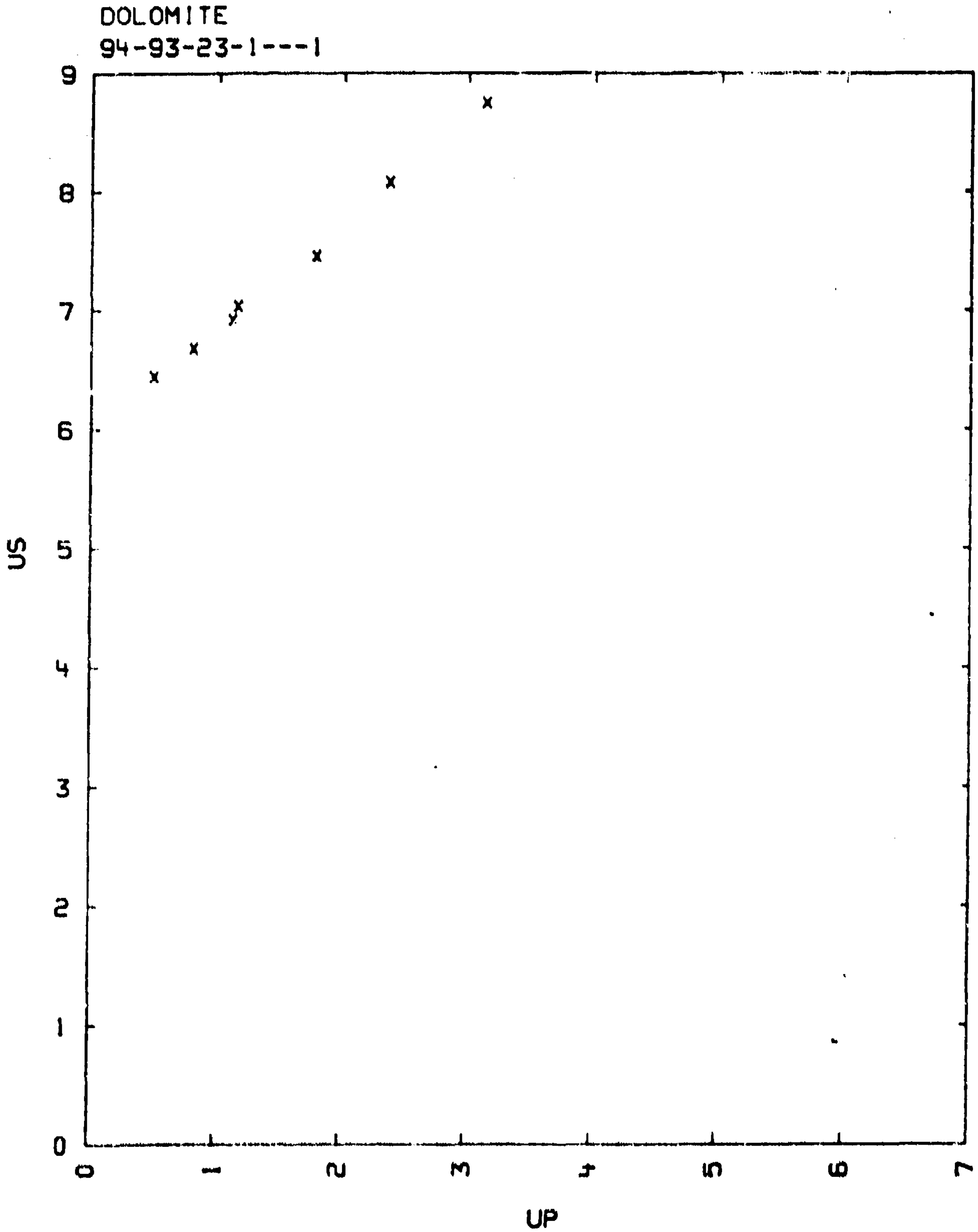
H2-O	SI-02	FE-O	FE2-03	CA-O	MG-O	AL2-03	C-02	INSOL
0.09	1.22	0.04	0.13	30.63	21.07	0.48	46.48	1.57

BETWEEN 1346 AND 1373 FEET SOMEWHAT PURER CARBONATE WAS OBTAINED

0.08	0.31	0.04	0.12	31.02	21.24	0.25	46.82	0.70

THE INSOL (INSOLUBLE IN 6N H-CL) FRACTION CONTAINED MOSTLY
SI WITH SOME AL, MG FE AND TI AS WELL AS A NUMBER OF TRACE ELEMENTS
6) PETROGRAPHIC ANALYSIS (J. S. KAHN OF THIS LABORATORY) SHOWED
ESSENTIALLY PURE DOLOMITE WITH SOME CLASTIC PARTICLES AND AN OCCASIO-
NAL QUARTZ VEIN. ALSO PRESENT SOME FE2-O3 AND CLAY. THE LATTER SHOWED
UP ESPECIALLY IN THE INSOL FRACTION AS MONTMORILLINITE TOGETHER
WITH QUARTZ AND GOETITE.
7) THE ABOVE COMPOSITION IS CONSISTANT WITH THIS ANALYSIS AND HAS
CONFIRMED BY AN X-RAY ANALYSIS MADE ON REPRESENTATIVE SAMPLES BY
I BORG, PRIVATE COMMUNICATION 1959

TABLE I



94-93-23-1---2
DOLOMITE

CA-MG-C2-06 94-97 WT. PERCENT
REST PROBABLY SIMILAR TO ENTRY 1

VO = 0.355 CC/G.
VOI =

THE TABLE LISTS DENSITY IN G/CC., VELOCITIES IN KM/SEC. AND PRESSURE IN KBAR.

TABLE

RHOO	US	UP	P	V/VO
2.82	11.54	5.32	1731.	0.540
-	10.02	4.14	1171.	0.587
-	9.77	3.73	1028.	0.618
-	8.44	2.65	631.	0.686

US = 5.39 + 1.15*UP KM/SEC
SIG.US = 0.11 KM/SEC.

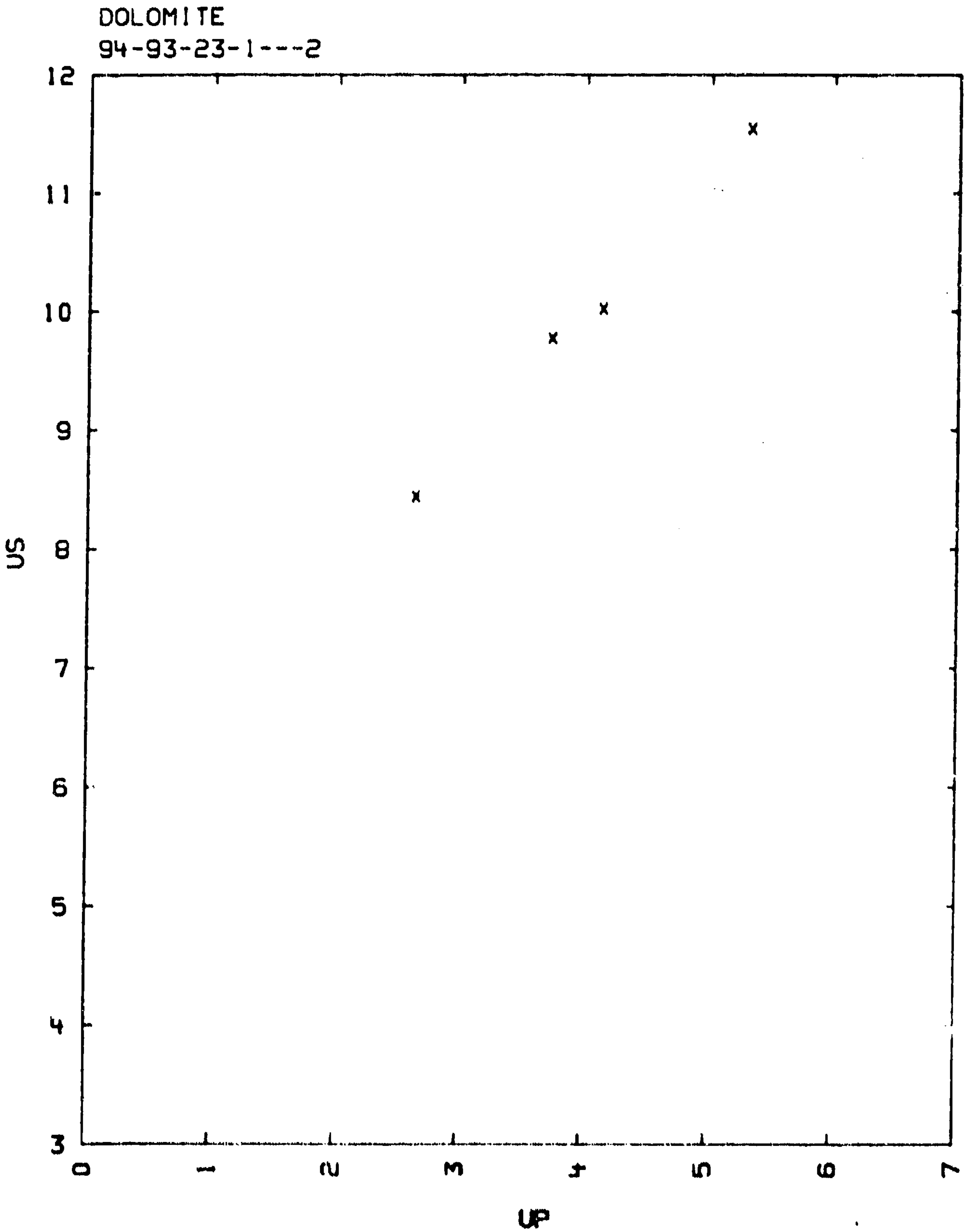
COMMENTS:

1) SOURCE: ISBELL W. M., SHIPMAN F. H. AND JONES A. H.
PROGRESS REPORT NO. 5, AUG. (1966)
ON CONTRACT DA-49-146-X2-429
GENERAL MOTORS TECHNICAL CENTER, WARREN, MICH., U.S.A.
2) EXPERIMENTAL TECHNIQUE: A. THE VELOCITY OF FANSTEEL OR HIGH PURITY COPPER PROJECTILES WERE DETERMINED BY TWO X-RAY FLASH PHOTOGRAPHS.
DATA REDUCTION TECHNIQUE: A
3) THE COMPOSITION OF THIS SAMPLE WAS ESTIMATED TO BE SIMILAR TO THAT OF A MEGASCOPICALLY SIMILAR SAMPLE FROM A NEIGHBORING AREA(BANDED MOUNTAIN NEVADA TEST SITE.) THIS SAMPLE WAS ALSO FROM THE SAME STRATUM THAT THE SAMPLES OF ENTRY ---1 WERE TAKEN FROM, BUT ABOUT 5 MILES AWAY AT THE APPROXIMATE NEVADA CENTRAL COORDINATES: N. 873,000 - E. 697,000, FROM DRILL HOLE D-1.12 AT 44.3-56.3 FEET DEPTH.
H. BARNES (DENVER COLO.) AND D. RAWSON (THIS LAB.), PRIVATE COMM.
H. BARNES, TECHNICAL LETTER NTS-185 (1967)
U.S. GEOLOGICAL SURVEY, FEDERAL CENTER, DENVER, COLO. 80225
4) X-RAY ANALYSIS OF A REPRESENTATIVE SAMPLE SHOWED THE FOLLOWING :

CALCITE	LESS THAN 5 WT PERCENT
SILICA	- - 1 - -
CLAY AND OTHER MINERALS	- - 1 - -

I BORG, PRIVATE COMMUNICATION 1969, LAWRENCE RAD. LAB., LIVERMORE

TABLE I



94-93-24-1---1
DIOPSIDE

CA-MG-SI2-O6 (SEE NOTE 3) GRAIN SIZE ABOUT 0.5 MM.

V0 =0.3046-0.3093 G/CC CL=5.83-8.00 KM/SEC.
V01=0.2994-0.3047 -

THE TABLE LISTS DENSITY IN G/CC. VELOCITIES IN KM/SEC AND PRESSURE IN KBAR. STM IS THE STANDARD BASE PLATE MATERIAL. AL=ALUMINUM AND BR=BRASS D=SAMPLE THICKNESS IN MM.

TABLE

SAMPLE											STANDARD	
RHO0	US1	UP1	P1	V1/V0	US2	UP2	UFS	P2	V2/V0	D	STM	UFS
3.283	7.31	.289	69.4	.960	6.30	0.68	1.33	149.7	.898	11	AL	1.51
3.233	7.66	.289	71.6	.962	6.86	0.96	1.88	219.7	.864	7	AL	2.11
3.279	7.92				7.69	1.26	2.51	317.7	.836	11	AL	2.82
3.272					7.92	1.43	2.77	370.6	.819	11	AL	3.18
3.233	8.52	.289	79.6	.966	8.03	1.89	3.70	494.4	.766	6	BR	3.03
3.233	10.00	.289	93.4	.971	9.22	2.09	4.21	628.9	.775	7	BR	3.45
3.233	8.90	.289	83.2	.968	8.33	2.47	4.93	660.2	.705	7	BR	3.90
3.106	6.57	.201	41.8	.969						17	AL	1.89

US2 =

COMMENTS:

1) SOURCE: AHRENS T.J., ROSENBERG J.T., RUDERMAN M.H.
STANFORD RESEARCH INSTITUTE REPORT NO DASA 1868 (1966)
STANFORD RESEARCH INSTITUTE, MENLO PARK, CALIFORNIA 94550
U.S.A.

2) EXPERIMENTAL TECHNIQUE C1 (INCLINED MIRROR)
DATA REDUCTION METHOD B D(ELASTIC WAVES)

3) THE ABOVE COMPOSITION IS NOMINAL. THE VALUES OF V01 WERE CALCULATED FROM A 96 PERCENT PURE DIOPSIDE (CRYSTAL DATA DETERMINATIVE TABLES) J.D.H.DONNAY AND H.M.ONDIK ED. (US DEP. OF COMMERCE, NBS. 3RD ED. 1973) P. M-97 : BETA= 105.27, A=9.6776, B=8.8938, C=5.2515 ANGSTROM, AND FROM A PRESUMED PURE SAMPLE WITH BETA=74.17 DEGREES, A=9.750 B=8.930 AND C=5.249 ANGSTROM.

4) UP1 WAS MEASURED ONLY IN THE FIRST AND LAST ENTRY, THE OTHER VALUES WERE ASSUMED.

5) THE LAST ENTRY WAS TAKEN ON A (001) SINGLE CRYSTAL WHICH CONTAINED VISIBLE CRACKS.

TABLE I

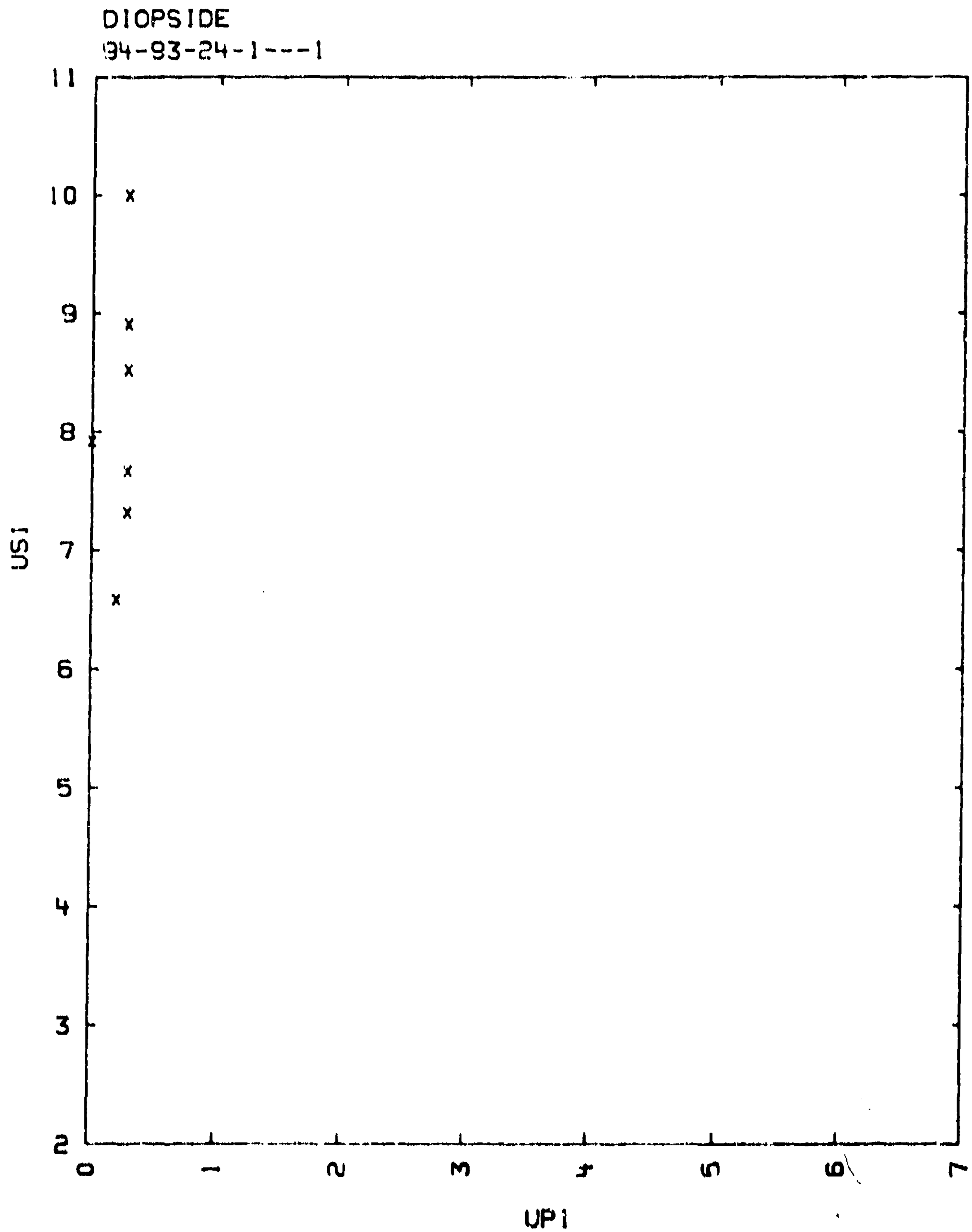
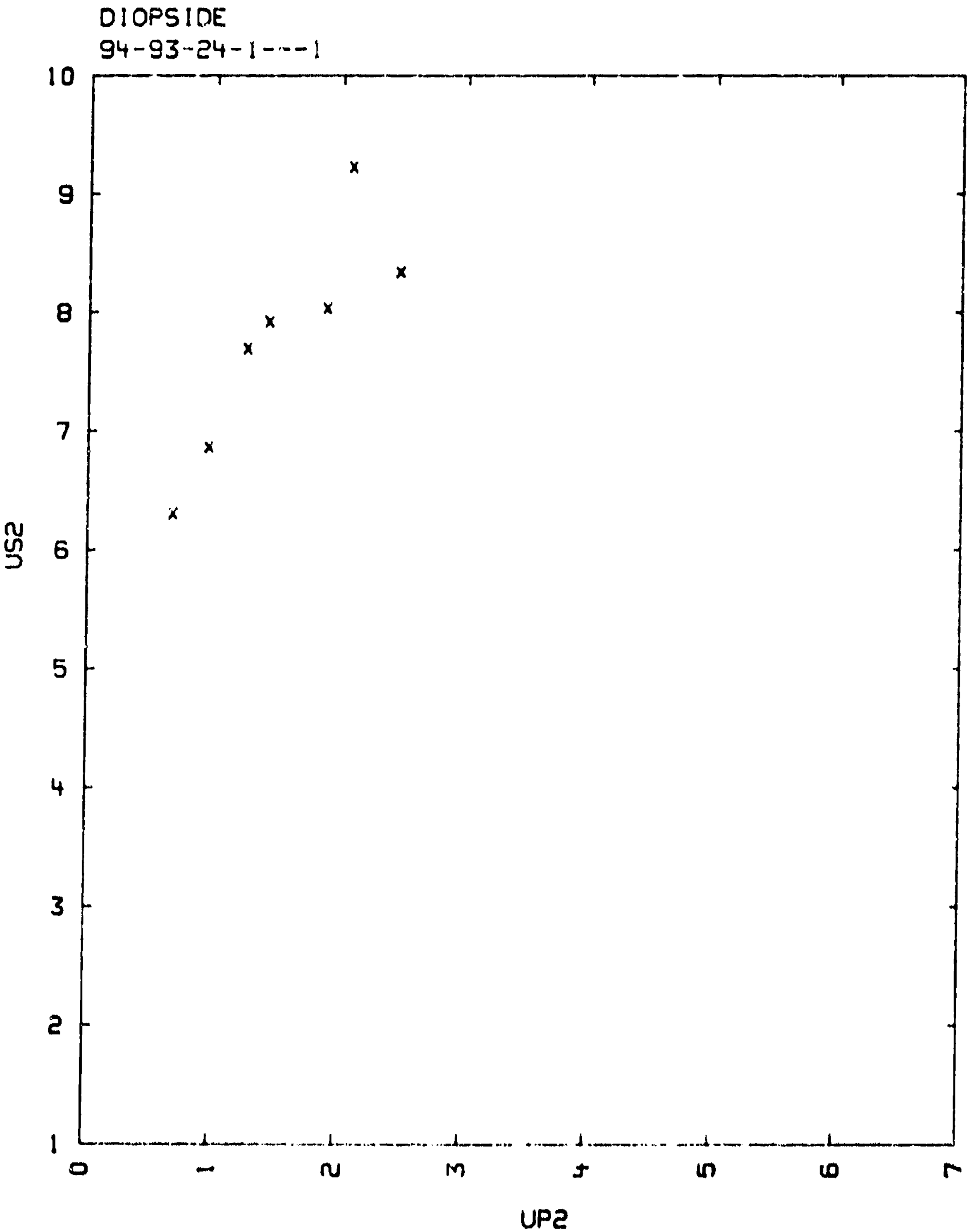


TABLE I



96-57-1---1
BARIUM TITANATE

BA-TI-03

VO = 0.184 CC/G.
VOI = 0.172 CC/G

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN KM/SEC., PRE   RE IN KILOBARS AND DENSITY IN G/CC.

TABLE

-------------SAMPLE-------------					--STANDARD--
RHOO	US	UP	P	V/VO	UFS
5.43	5.605	1.250	380	0.777	3.040
-	5.683	1.257	388	0.779	3.080
-	5.342	1.290	374	0.759	3.060
-	5.574	1.250	378	0.776	3.040
-	5.302	1.106	318.5	0.791	2.665
-	5.342	1.114	323	0.791	2.690
-	5.382	1.157	338	0.785	2.800
-	5.476	1.160	345	0.788	2.820
-	5.453	1.172	347	0.785	2.860
-	5.476	1.195	355	0.782	2.900
-	5.246	1.215	344	0.768	2.875
-	5.291	1.165	334	0.780	2.780
-	4.935	1.025	275	0.792	2.452
-	4.892	1.035	275	0.788	2.425
-	4.990	1.047	284	0.790	2.475
-	4.990	1.055	287	0.789	2.490
-	4.955	1.037	273	0.790	2.420
-	4.849	1.042	275	0.785	2.430
-	5.268	1.010	281	0.808	2.425
-	5.117	1.005	279	0.803	2.405
-	5.285	1.042	300	0.803	2.530
-	5.347	1.040	302	0.805	2.535
-	5.035	1.110	303	0.779	2.615
-	5.039	1.117	306	0.778	2.635
-	4.695	0.860	219	0.817	2.015
-	4.621	0.860	216	0.814	2.005
-	4.672	0.865	220	0.815	2.027
-	4.721	0.867	223	0.816	2.040
-	4.708	0.775	199	0.835	1.845
-	4.633	0.787	199	0.830	1.855
-	4.212	0.810	185	0.807	1.815
-	4.212	0.817	186.5	0.806	1.830
-	3.876	0.605	128	0.844	1.340
-	3.843	0.610	127	0.841	1.345
-	4.078	0.605	134	0.852	1.375
-	4.098	0.590	132	0.856	1.350
-	3.977	0.630	137.5	0.841	1.415
-	4.012	0.620	136	0.845	1.400
-	3.623	0.655	128.5	0.819	1.392
-	3.623	0.645	127	0.821	1.377

BARIUM TITANATE

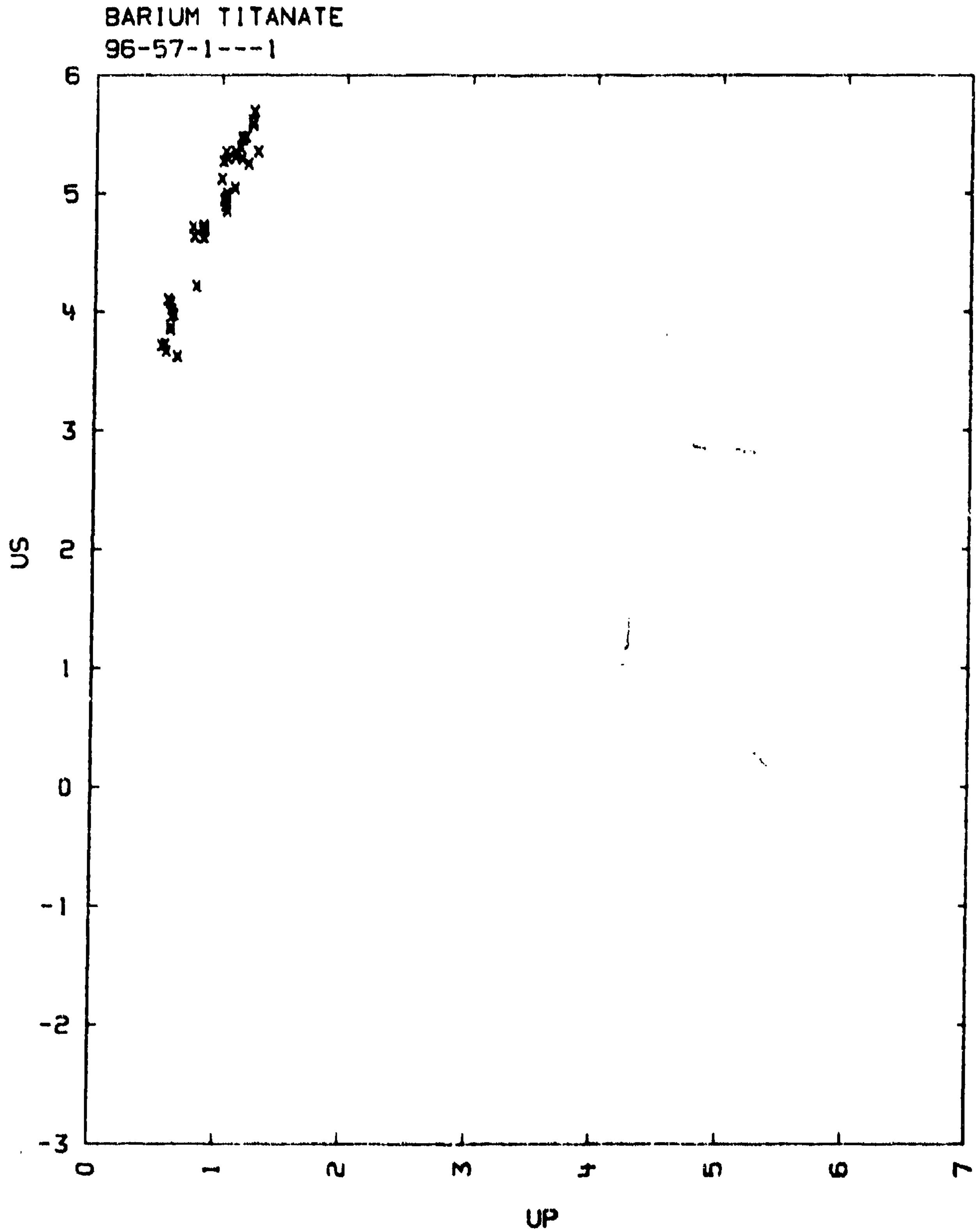
RHOO	US	UP	P	V/VO	UFS
-	3.706	0.533	107	0.856	1.167
-	3.706	0.537	108	0.855	1.173
-	3.725	0.560	112	0.849	1.220
-	3.663	0.570	113	0.844	1.232

US = 2.32 + 2.60 UP KM/SEC, SIG.US = 0.19 KM/SEC.

COMMENTS:

1) SOURCE: BERGER J. AND FAUQUIGNON C.
PRIVATE COMMUNICATION (1964), B.P. NO. 7, SEVRAN, FRANCE
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION TECHNIQUE B
STANDARD MATERIAL ALUMINUM AU4G ALLOY
3) VOI WAS OBTAINED FROM CRYSTAL DATA DETERMINATIVE TABLES (AMERICAN CRYSTALLOGRAPHIC ASSOCIATION, POLYCRYSTAL BOOK SERVICE, BROOKLYN, N.Y., 1963) 2ND ED.
4) SAMPLE DIMENSIONS WERE: 2.0 CM DIAMETER
0.5 CM THICKNESS

TABLE I



96-57-1---2
BARIUMTITANATE-CALCIUMTITANATE CERAMIC

SILICA	SI-02	0.30	WEIGHT	PERCENT
ALUMINUM OXIDE	AL2-03	0.29	-	-
STRONTIUM OXIDE	SR-0	0.22	-	-
SODIUM OXIDE	NA2-0	0.17	-	-
PHOSPHORUSPENTOXIDE	P2-05	0.11	-	-
CALCIUMTITANATE	CA-TI-03	5.	-	-
BARIUMTITANATE	BA-TI-03	REMAINDER	-	-

V0 = 0.180-0.181 CC/G CL = 5.48
V0I= 0.1705 CC/G

TABLE I LISTS ELASTIC WAVE MEASUREMENTS FOR SEVERAL EXPERIMENTS. TABLES II AND III LIST A THREE-WAVE SYSTEM OBSERVED IN ONE EXPERIMENT (SEE COMMENTS). TABLES IV AND V LIST DOUBLE WAVES OBSERVED IN A SERIES OF MOR CONVENTIONAL EXPERIMENTS. TABLE VI LISTS ELASTIC WAVE POINTS FOR A SAMPLE AT 130 DEG. C. IN THE CUBIC PHASE. EXPNO = SOURCE EXPERIMENT NUMBER. DENSITIES ARE IN G/CC, VELOCITY IN KM/SEC, PRESSURE IN KBARS. D IS SAMPLE THICKNESS IN MM. LUC = LUCITE. 4340 = STEEL ALLOY.

TABLE I
PRESSURE GRADIENT EXPERIMENTS

RHO0	T0	US	UP	P	V/V0	EXPNO
5.54	20	6.29	0.0855	29.8	0.9864	7396
-	17	5.58	0.0324	10.0	0.9942	7540
-	-	5.49	0.0301	9.17	0.9945	-
-	-	5.37	0.0261	7.78	0.9951	-
-	-	5.31	0.0255	7.51	0.9952	-
-	-	5.31	0.0243	7.16	0.9954	-
-	-	5.31	0.0237	6.98	0.9955	-
-	20	6.28	0.0885	30.9	0.9859	7592
-	-	6.27	0.0855	29.7	0.9864	-
-	-	6.27	0.0870	30.3	0.9861	-
-	-	6.23	0.0806	27.9	0.9871	-
-	-	6.15	0.0707	24.1	0.9885	-
-	-	6.09	0.0637	21.5	0.9895	-
-	-	6.07	0.0628	21.2	0.9897	-
-	-	6.05	0.0623	20.9	0.9897	-
-	-	6.04	0.0608	20.4	0.9899	-
-	-	6.03	0.0578	19.3	0.9904	-
-	-	6.00	0.0564	18.8	0.9906	-
-	-	5.99	0.0543	18.0	0.9909	-
-	21	6.19	0.0739	25.3	0.9881	7612
-	-	6.18	0.0734	25.2	0.9881	-
-	-	6.11	0.0639	21.6	0.9895	-
5.54	21	6.06	0.0605	20.4	0.9900	7612
-	-	5.95	0.0488	16.1	0.9918	-
-	-	5.90	0.0478	15.6	0.9919	-
-	-	5.86	0.0474	15.4	0.9919	-
-	-	5.82	0.0420	13.5	0.9928	-
-	-	5.71	0.0410	13.0	0.9928	-
-	-	5.67	0.0379	12.0	0.9934	-

BARIUMTITANATE-CALCIUMTITANATE CERAMIC

RHOO	TO	US	UP	P	V/VO	EXPNO
-	-	5.59	0.0326	10.1	0.9942	-
-	-	5.52	0.0295	9.05	0.9946	-

US =

TABLE II
TRIPLE-WAVE PRESSURE GRADIENT EXPERIMENT (VELOCITIES)

NO	RHOO	US1	UP1	US2	UP2	US3	UP3
1	5.54	6.27	0.0887	5.3	0.129	4.57	0.355
2	-	-	0.0882	-	0.127	4.54	0.368
3	-	-	0.0894	-	0.137	4.40	0.300
4	-	-	0.0854	-	0.135	4.33	0.327
5	-	-	0.0876	-	0.126		
6	-	-	0.0854	-	0.121	4.20	0.280
7	-	-	0.0870	-	0.128		
8	-	-	0.0876	-	0.118		

US =

TABLE III
TRIPLE-WAVE PRESSURE GRADIENT EXPERIMENTS (P - V)

NO	RHOO	P1	V1/VO	P2	V2/VO	P3	V3/VO
1	5.54	30.8	0.9859	43	0.9782	99	0.929
2	-	30.6	0.9859	44	-	102	0.926
3	-	31.1	0.9857	45	-	83	0.937
4	-	29.6	0.9864	45	-	90	0.932
5	-	30.4	0.9860	41	-		
6	-	29.6	0.9864	41	-	76	0.938
7	-	30.2	0.9861	42	-		
8	-	30.4	0.9860	39	-		

TABLE IV
PLANE WAVE EXPERIMENTS

RHOO	US1	UP1	US2	UP2	UFS/2	D	EXPNO
5.54			4.78	0.60	0.53	6	7384
-	6.15	0.108	4.89	0.56	0.48	6	7400
-	6.15	0.107	5.18	0.6	0.56	12.5	7446
-	6.32	0.11	5.82	0.98	0.96	6	7447
-	6.39	0.108	4.59	0.50	0.46	6	7591
-	5.25	0.0175				6	8445

BARIUMTITANATE-CALCIUMTITANATE CERAMIC

RHOO	US1	UP1	US2	UP2	UFS/2	D	EXPNO
-	5.90	0.0492				5	8748
-	6.15	0.098					8882
-	6.08	0.065				5.4	8883
-	5.24	0.016				6	8884

US1 = 4.70 + 31.37*UP + 151.2*UP**2 KM/SEC (FIRST WAVE)
SIG US = 0.037 KM/SEC FOR UP FROM 0.016 TO 0.11 KM/SEC

US2 = 3.68 + 2.16*UP KM/SEC (LAST WAVE)
SIG US = 0.13 KM/SEC FOR UP FROM 0.3 TO 1.0 KM/SEC

TABLE V
PLANE WAVE EXPERIMENTS

------------SAMPLE------------					---STANDARD---		
RHOO	P1	V1/V0	P2	V2/V0	P	EXPNO	MAT
5.54			169	0.875	133	7384	AL
-	37	0.982	149	0.901	125	7400	AL
-	37	0.982	167	0.896	133	7446	AL
-	40	0.982	310	0.8363	245	7447	AL
-	38	0.983	127	0.9055	67	7591	LUCITE
-	5.1	0.9967			7.9	8445	IRON
-	16	0.9917			18	8748	STEEL
-	34	0.9840			32	8882	LUCITE
-	22	0.9891			23	8883	STEEL
-	4.7	0.9969			2.5	8884	LUCITE

TABLE VI
130-DEG. PRESSURE GRADIENT EXPERIMENT

RHOO	US1	UP1	P1	V/V0
5.54	6.39	0.0910	32.2	0.9058
-	6.38	0.0780	27.6	0.9878
-	6.38	0.0715	25.3	0.9888
-	6.37	0.0740	26.2	0.9884
-	6.36	0.0815	28.8	0.9872
-	6.34	0.0715	25.2	0.9887
-	6.33	0.0505	17.7	0.9920
-	6.32	0.0585	20.5	0.9908
-	6.32	0.0595	20.9	0.9906
-	6.31	0.0570	20.0	0.9910
-	6.30	0.0510	17.8	0.9913
-	6.29	0.0495	17.3	0.9921
-	6.28	0.0443	15.5	0.9930
-	6.28	0.0416	14.5	0.9934
-	6.28	0.0440	15.3	0.9930

BARIUMTITANATE-CALCIUMTITANATE CERAMIC

RHOO	USI	UPI	PI	V/VO
-	6.28	0.0485	16.9	0.9923
-	6.28	0.0448	15.6	0.9929
-	6.28	0.0421	14.7	0.9933
-	6.28	0.0384	13.4	0.9939
-	6.28	0.0375	13.1	0.9940

US =

COMMENTS:

1) SOURCE: DORAN, D. G.
J. APPL. PHYS., VOL. 39, P. 40, (1968)
2) EXPERIMENTAL TECHNIQUE C2 (TABLES IV AND V) AND D (THE REST)
TABLES IV AND V DATA WERE OBTAINED WITH A PLANE WAVE EXPLOSIVE SYSTEM, WHILE THE OTHER DATA WERE OBTAINED WITH A CONFIGURATION THAT IMPRESSED A PRESSURE GRADIENT ACROSS THE FACE OF THE SAMPLE.
DATA REDUCTION METHOD: D WITH 2UP= UFS IN MOST CASES.
D AND B AVERAGED TO PARTIALLY CORRECT FOR ATTENUATION IN SOME TABLES IV AND V ENTRIES.
3) VOI WAS OBTAINED FROM THE CRYSTAL DENSITIES OF BA- AND CA-TI-O3 ASSUMING VOLUME ADDITIVITY : WYCKOFF, CRYSTAL STRUCTURES, VOL II (JOHN WILEY AND SONS, N. Y. 1963) 2ND ED.

FOR BA-TI-O3	20 DEG C	MONOCLINIC	A = 3.9947 ANGSTROM	
- -	- - -	-	C = 4.0330	-
- -	201 - -	CUBIC	A = 4.0118	-
- -	1372 - -	-	A = 4.0783	-
FOR CA-TI-O3	26 -	-	A = 3.84	-

4) IN EXPERIMENTS NO 7400 AND 7446 THE REFLECTION OF THE ELASTIC WAVE IS EXPLICITLY TAKEN INTO ACCOUNT IN CALCULATING US2.
5) THE TABULATION IN TABLES II AND III IS A SIMPLIFICATION OF A MORE COMPLEX WAVE SYSTEM: WAVE 1 IS A SIMPLE STEP, BUT WAVE 2 IS A GRADIENT WITH A GRADUAL PRESSURE INCREASE OF ABOUT 10-15 KBARS, WHILE WAVE 3 APPEARS TO BE SPLIT INTO TWO WAVES WITH NEARLY THE SAME VELOCITY.
6) THE CURIE TEMPERATURE IS 115 DEG. C.
7) DENSITY UNIFORMITY OF THE SAMPLES WAS 0.06 G/CC MAXIMUM.
8) A FIT GIVEN BY REYNOLDS AND SEA, J. APPL. PHYS., VOL. 33, P 2234 (1962),FOR PURE BA-TI-O3 WITH VO = 0.175 IS:
USI = 4.34 + 21.2*UPI KM/SEC, FOR UPI FROM 0.0 TO 0.074+OR- 0.002
US2 = 3.51 + 1.69*UP2 - - UP2 - 0.074+OR- 0.002 TO 1.0
SIGUS = 1.0 PERCENT.
9) THE FREE SURFACE EXPERIMENT NUMBERS 7447, 7591, AND 8882 WERE MADE ON SAMPLES HALF AS THICK AS THOSE ON WHICH THE SHOCK VELOCITIES WERE MEASURED, NAMELY 3MM. THE THICKNESS INDICATED FOR EXPERIMENT 8882 IS THE MAXIMUM THICKNESS OF A 10-DEG. WEDGE.

TABLE I

BARIUMTITANATE-CALCIUMTITANATE CERAMIC

96-57-1---2

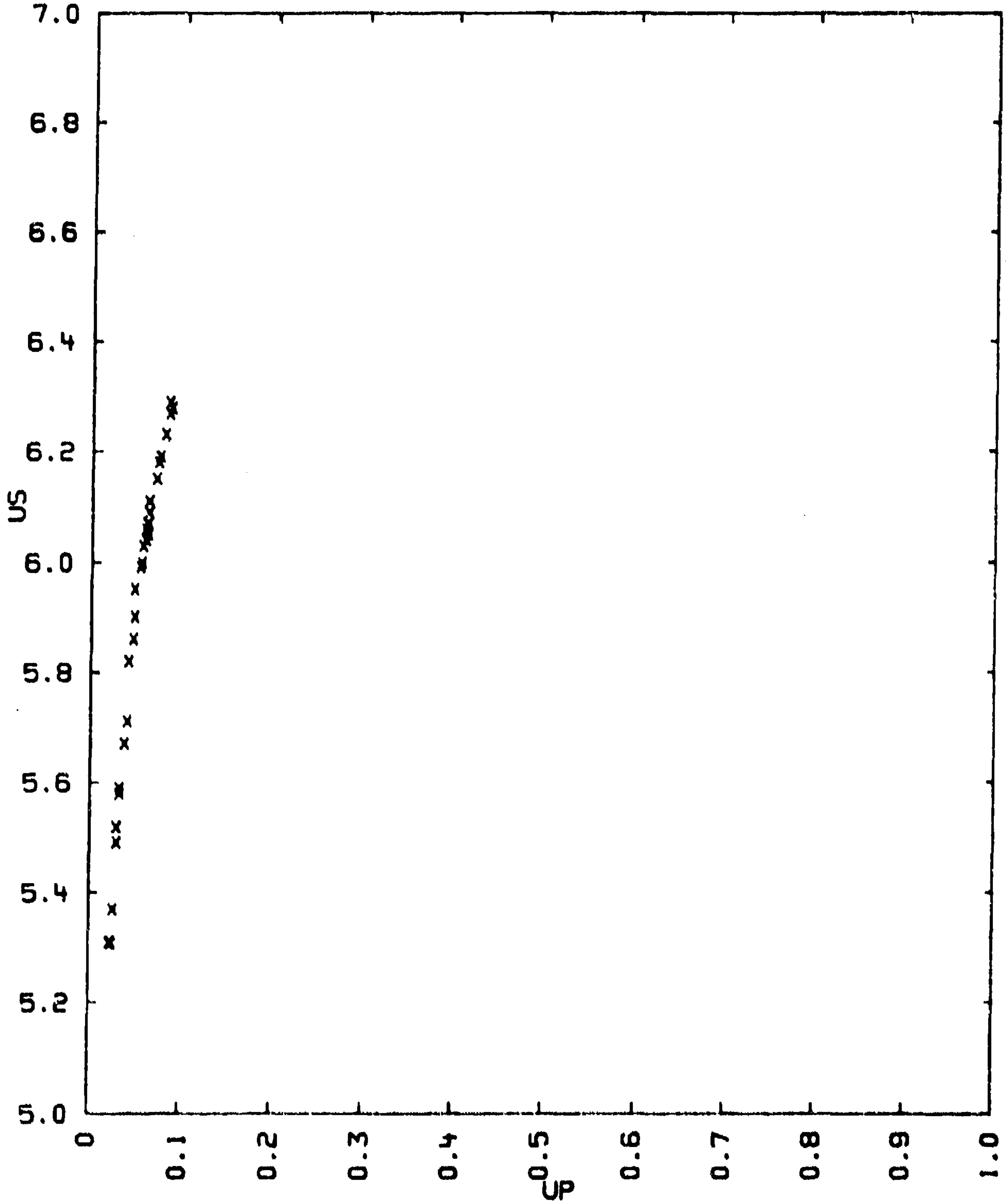


TABLE II

BARIUMTITANATE-CALCIUMTITANATE CERAMIC

96-57-1---2

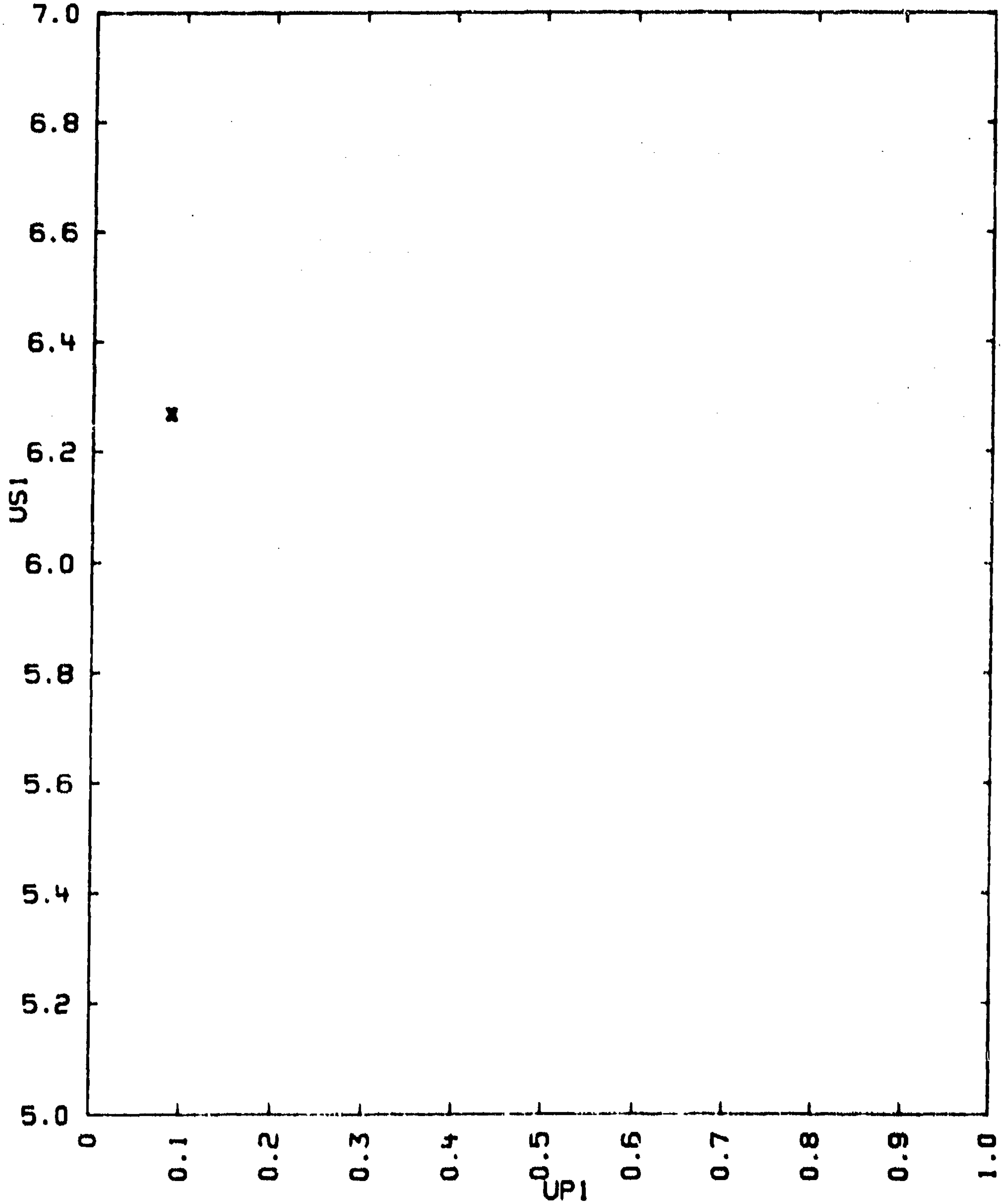


TABLE II

BAR!UMTITANATE-CALCIUMTITANATE CERAMIC

96-57-1---2

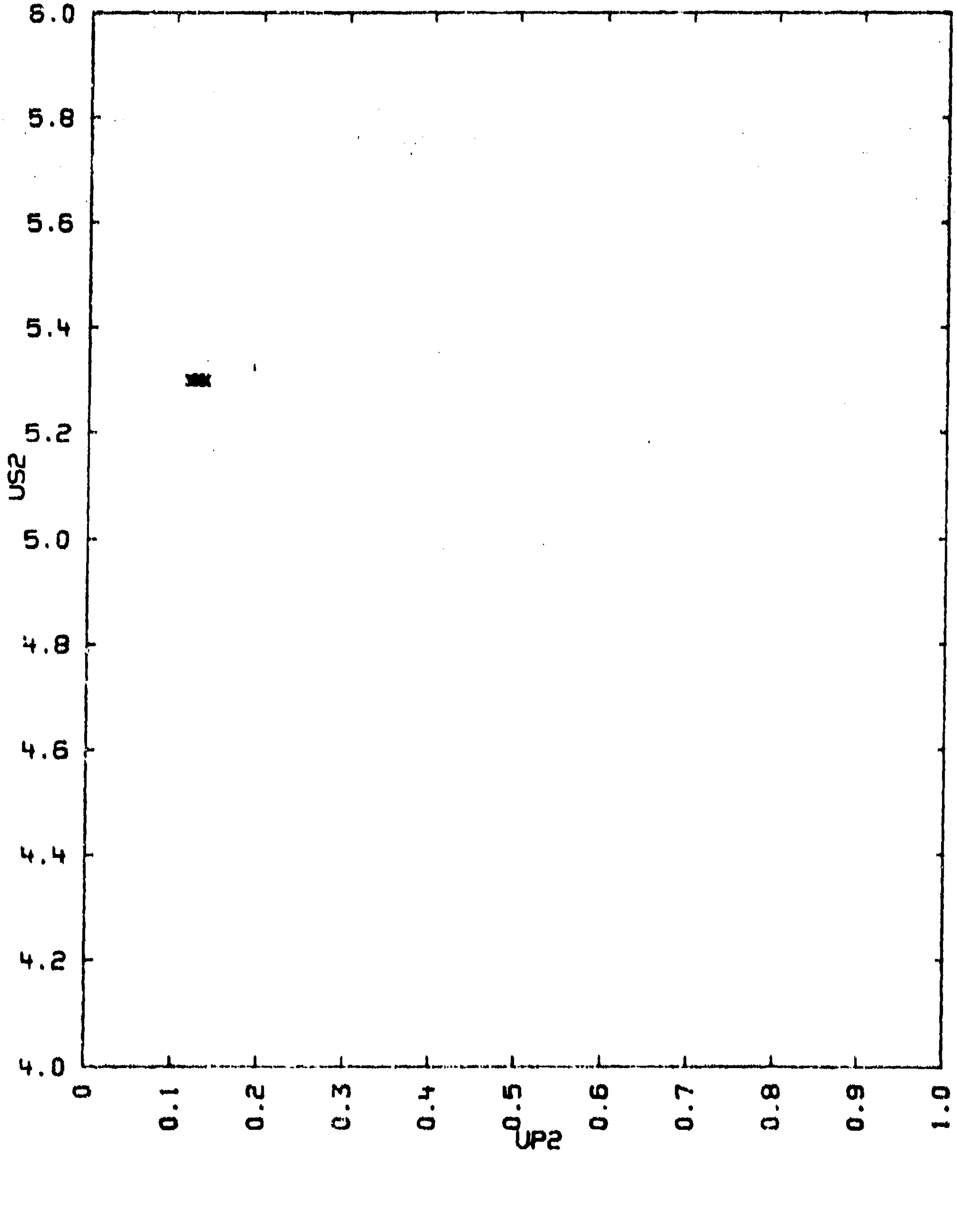


TABLE II

BARIUMTITANATE-CALCIUMTITANATE CERAMIC

96-57-1---2

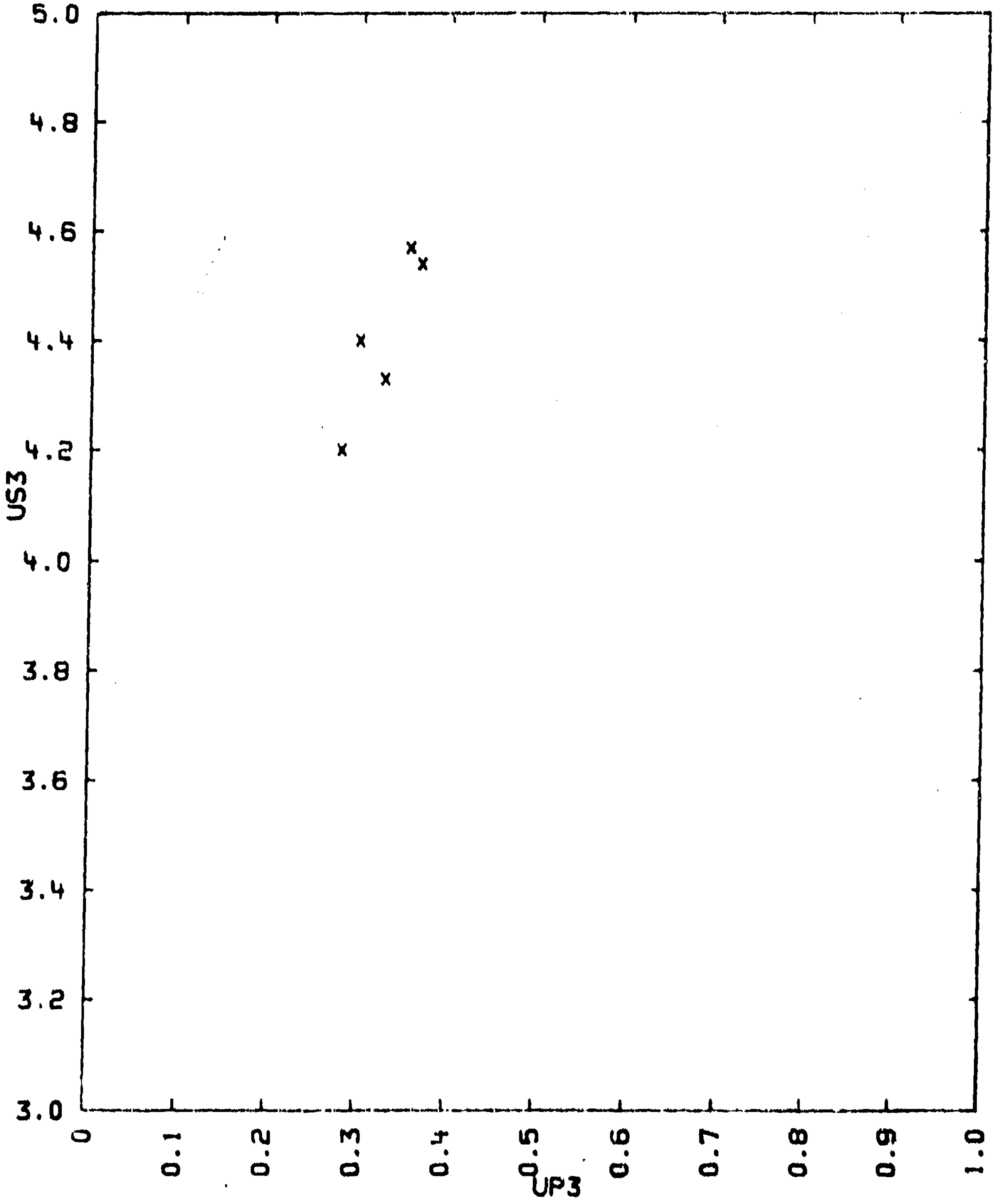


TABLE IV

BARIUMTITANATE-CALCIUMTITANATE CERAMIC

96-57-1---2

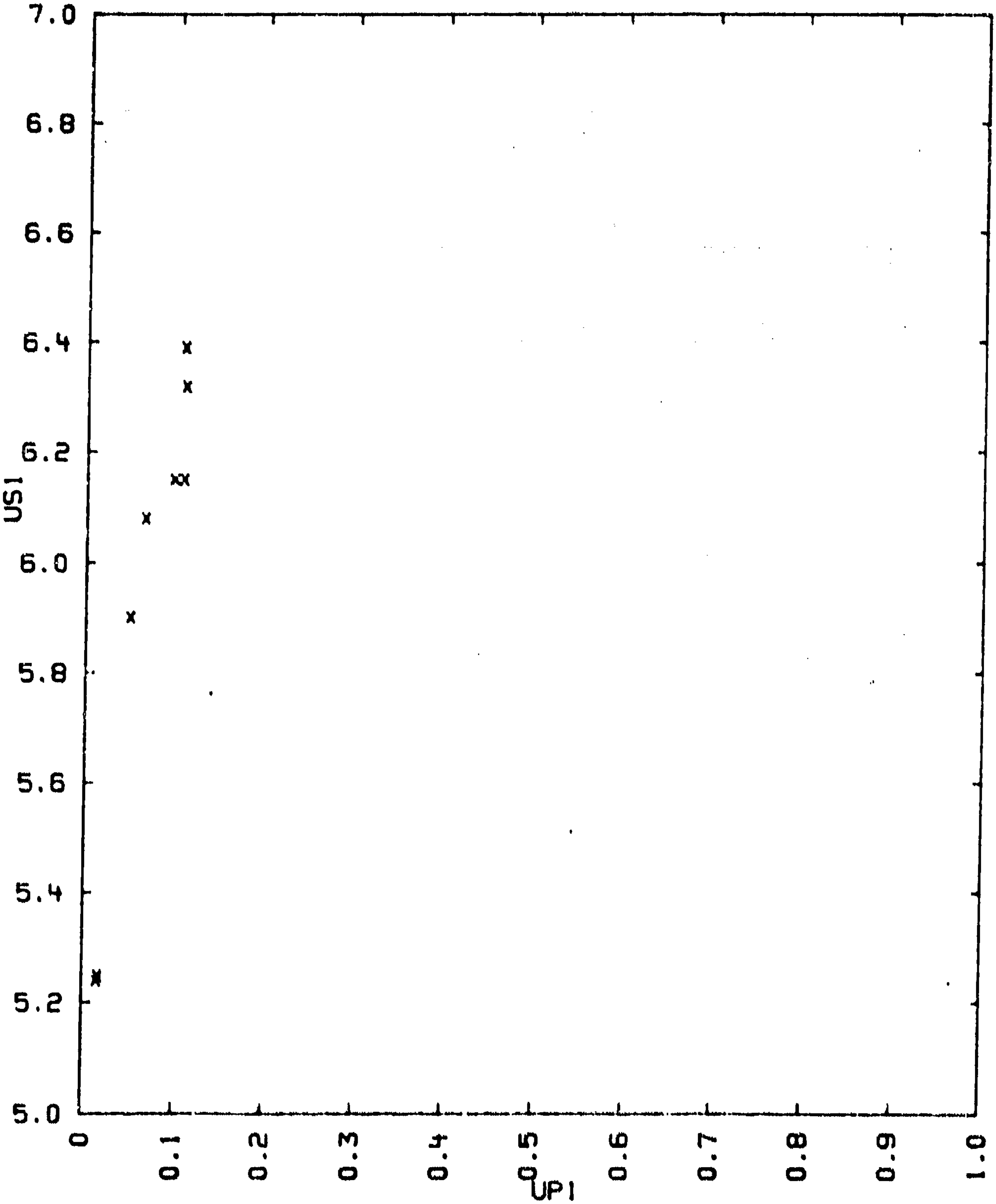


TABLE IV

BARIUMTITANATE-CALCIUMTITANATE CERAMIC

96-57-1---2

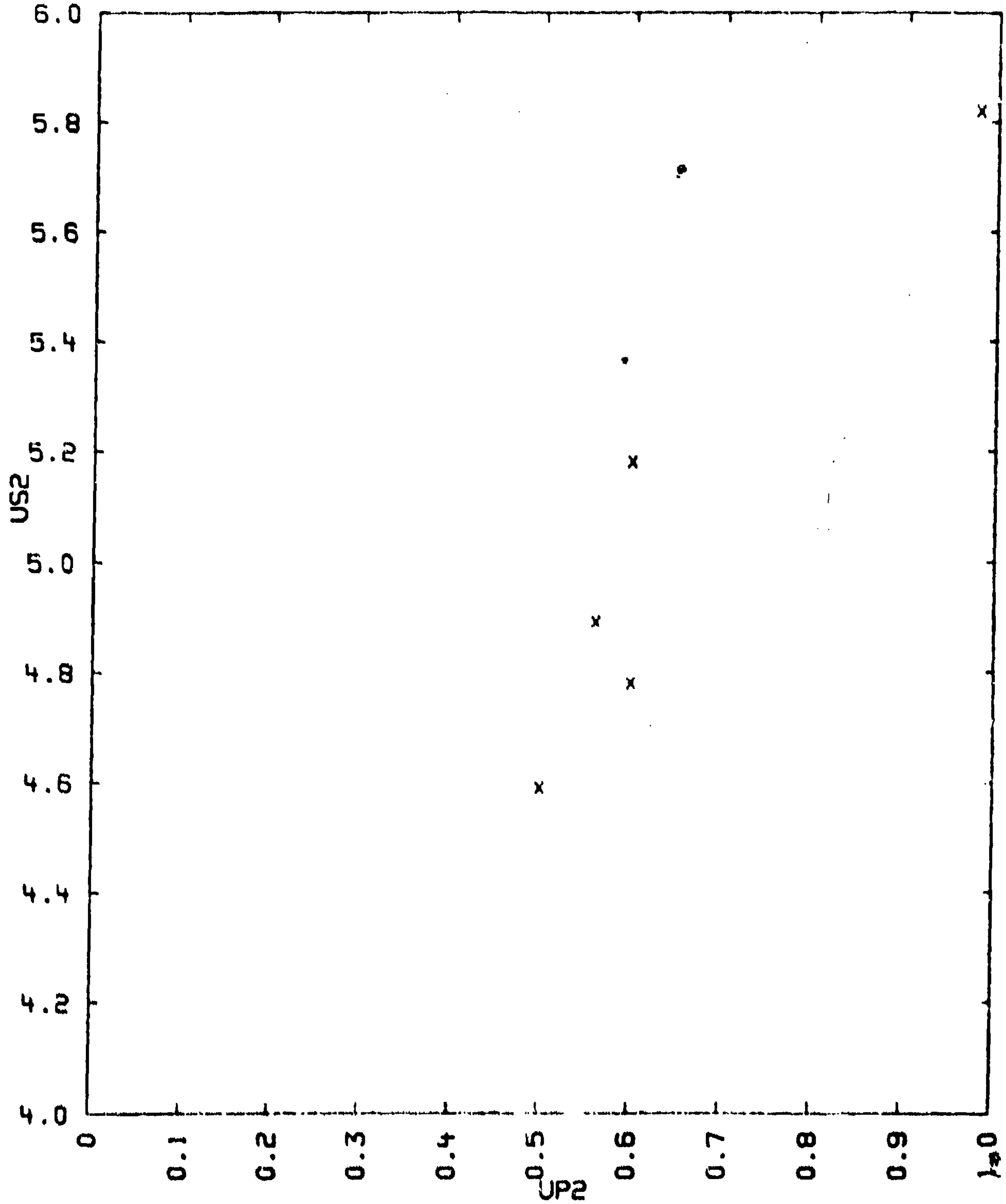
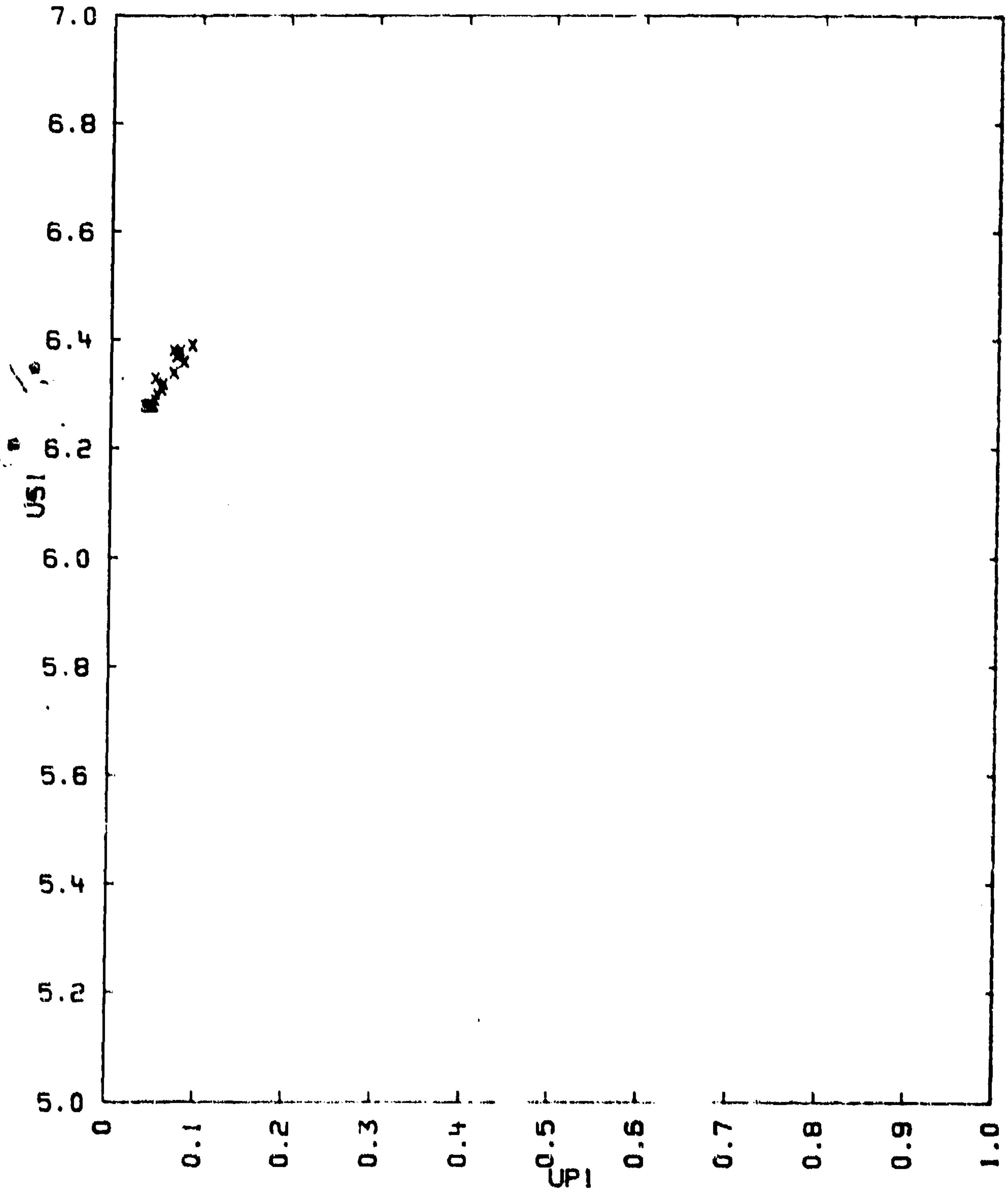


TABLE VI

BARIUMTITANATE-CALCIUMTITANATE CERAMIC

96-57-1---2



98-2---1
LITHIUM HYDRIDE

LI-H :
LITHIUM 7 ISOTOPE   92.5 ATOM PERCENT
- 6 -   7.5 - -

V0 = 1.335 CC/G   CL = 10.02 KM/SEC   C0 = 6.22 KM/SEC.
V01= 1.294 CC/G   CS = 6.80 KM/SEC

THE TABLE LISTS DENSITY IN G/CC., VELOCITIES IN KM/SEC AND PRESSURES IN KBAR. A ,1, INDICATES THE ELASTIC- AND A ,2, THE PLASTIC WAVE. MET = EXPERIMENTAL METHOD.

TABLE

RHO0	US1	UP1	P1	V1/V0	US2	UP2	P2	V2/V0	MET
0.749	9.51	0.007	0.47	0.9993	5.89	0.82	36.3	0.86	F
0.749	9.68	0.005	0.38	0.9995	7.62	1.66	96.3	0.78	-
0.749	9.40	0.005	0.37	0.9995	8.40	2.21	137.4	0.74	-
0.749	9.43				8.71	2.50	163.2	0.71	-
0.749	9.05	0.01	0.66	0.9989	5.89	0.87	38.4	0.85	A
0.749	8.93	0.008	0.51	0.9991	6.53	1.14	55.4	0.83	-

US2 = 3.553 + 3.113*UP - 0.419*UP**2 KM/SEC

COMMENTS:

1) SOURCE: MAY, R. P., BIESECKER, R. G. AND KING, T. N.
SANDIA CORPORATION REPORT, SC-TM-68-113, APRIL 1968.
SANDIA CORPORATION, ALBUQUERQUE, NEW MEXICO, U.S.A.
2) EXPERIMENTAL TECHNIQUE: F AND A
DATA REDUCTION METHOD: B* AND B RESPECTIVELY
3) THE SAMPLES WERE OBTAINED FROM UNION CARBIDE NUCLEAR DIV.
4) CL, CS AN C0 WERE DETERMINED BY T. R. GUESS, SANDIA LABORATORY, ALBUQUERQUE, NEW MEXICO, U.S.A.
5) PRELIMINARY DATA, WORK IN PROGRESS.

TABLE I

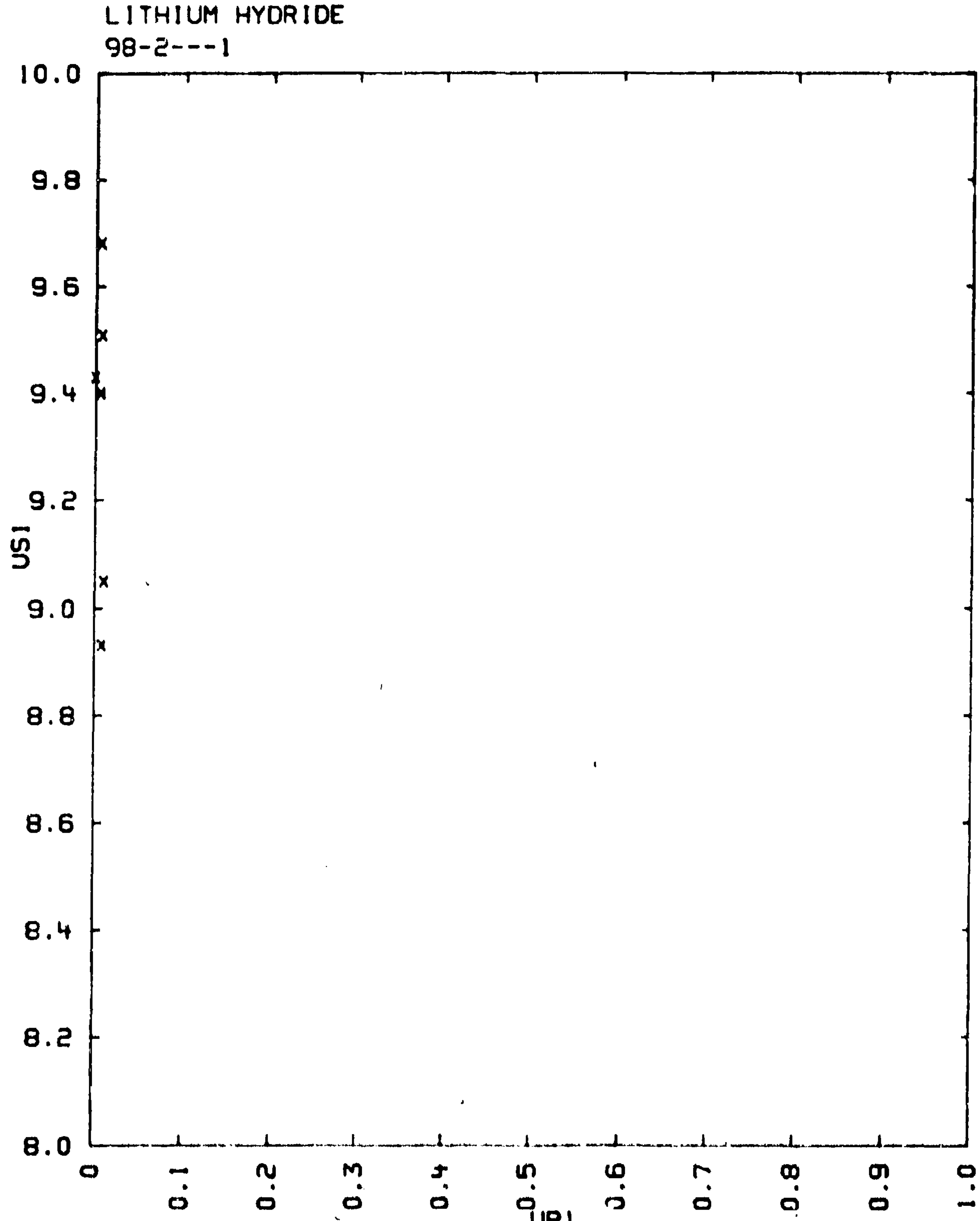
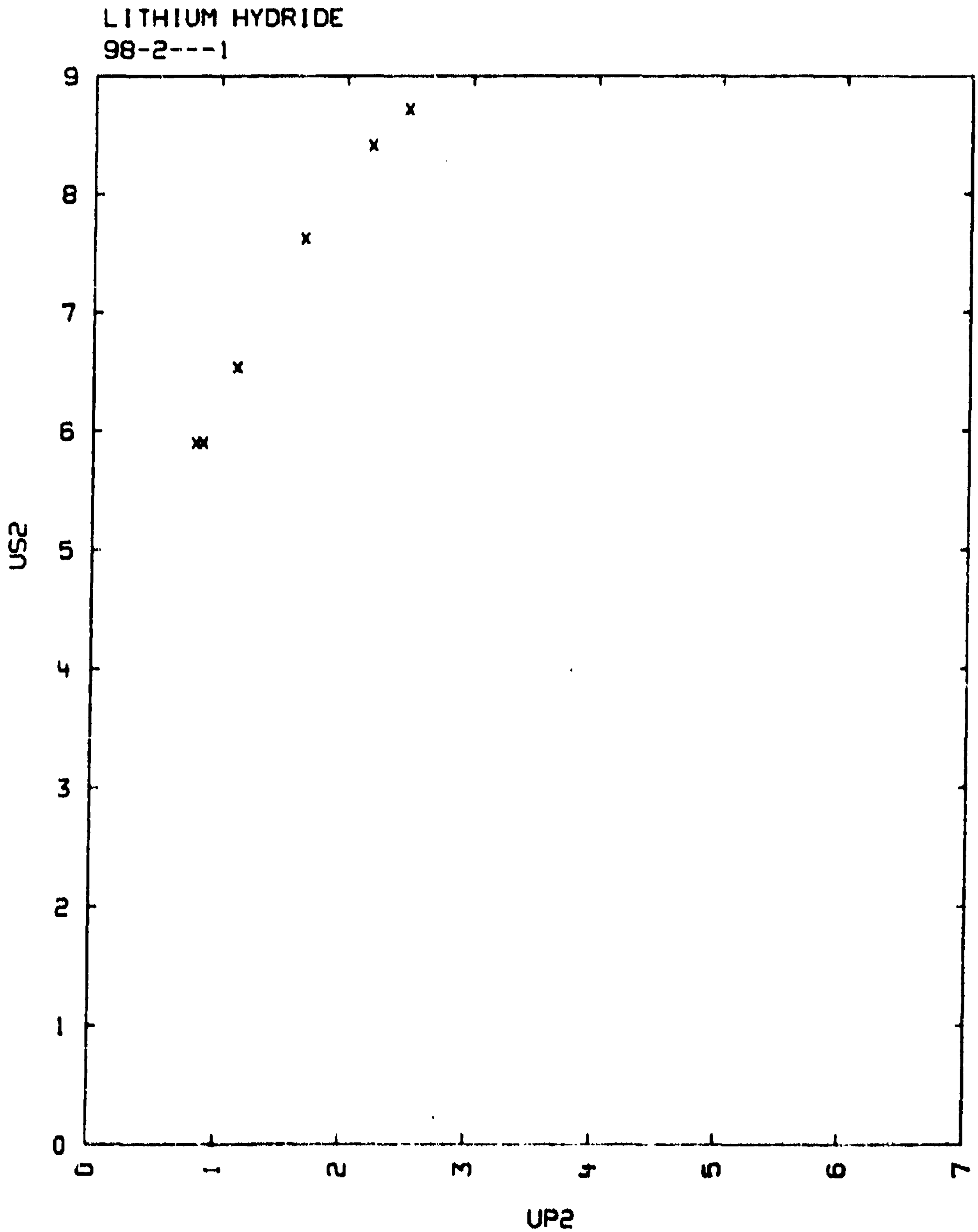

LITHIUM HYDRIDE
98-2---1
10.0
9.8
9.6
9.4
9.2
9.0
8.8
8.6
8.4
8.2
8.0
USI
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
UPI

TABLE I



98-9---1
LITHIUM FLUORIDE

LI-F

V0 = 0.3773 CC/G
V01 = 0.3788 CC/G CB = 4.97 KM/SEC

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN KM/SEC AND PRESSURE IN KILOBARS. SH DESIGNATES SAMPLE HOLDER.

TABLE

RHO0	US	UP	P	V/V0	SH	UP(SH)
2.65	5.74	0.52	79.0	0.9091	CU	0.37
-	7.14	1.53	289.5	0.8019	AL	1.50
-	7.52	1.73	345.0	0.7692	AL	1.71
-	8.97	2.87	683.0	0.6803	AL	2.82
-	10.43	3.79	1036.0	0.6394	FE	2.80

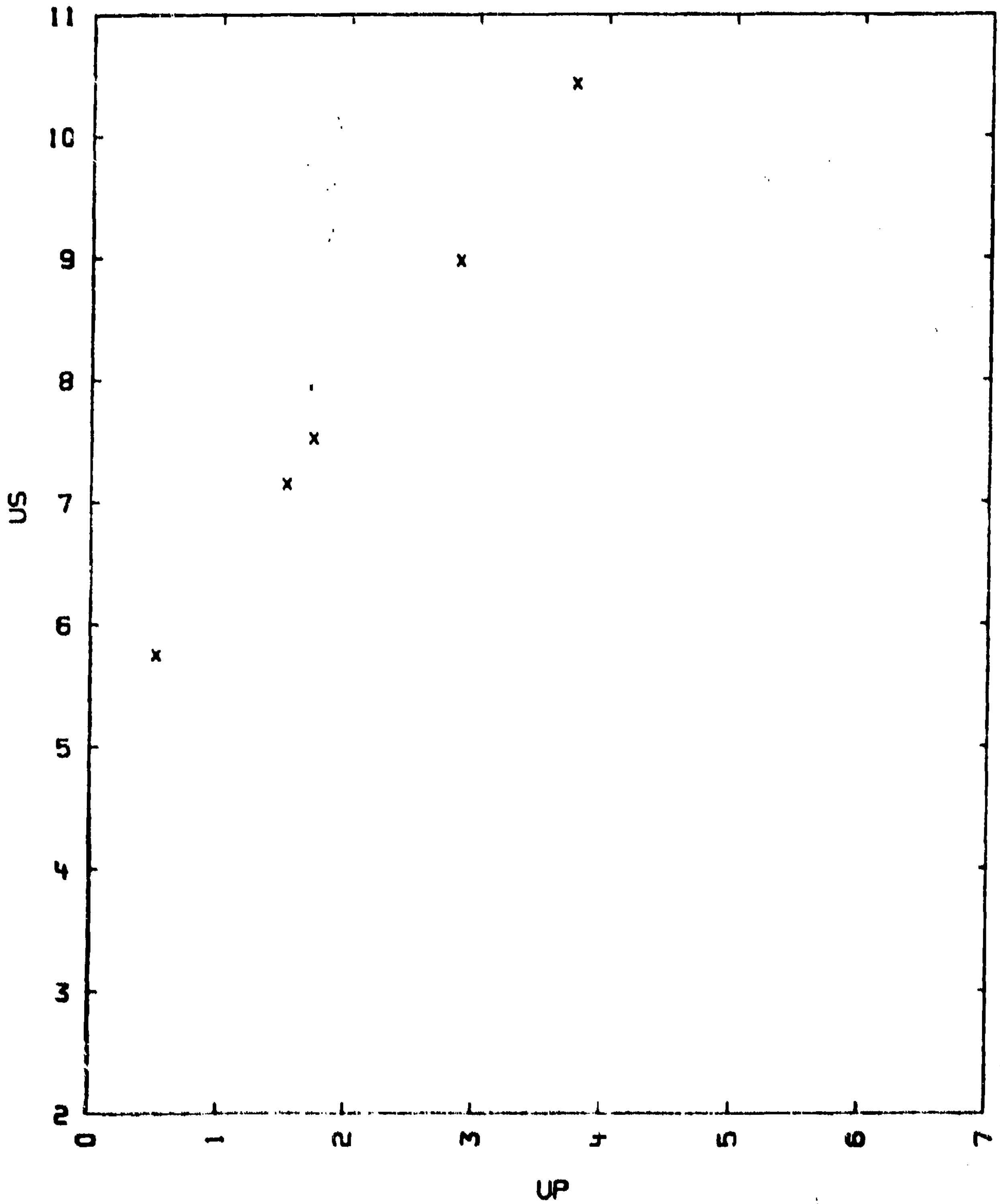
US = 4.98 + 1.434 UP KM/SEC FOR UP BETWEEN 0 AND 4 KM/SEC
SIG US = 0.093

COMMENTS:

1) SOURCE: AL'TSHULER, L.V., PAVLOVSKII, M.N., KULESHOVA, L.V., AND SIMAKOV, G.V.
SOVIET PHYS.-SOLID STATE, VOL. 5, P. 203 (1963)
2) EXPERIMENTAL TECHNIQUE A
DATA REDUCTION TECHNIQUE B.
3) THE SAMPLES WERE POSITIONED ON PLATES OF CU AL AND FE AS INDICATED IN TAB _ COLUMN 6.
THE HUGONIOTS OF FE CU AND AL WERE OBTAINED FROM
AL'TSHULER, L.V., KORMER, S.B., BAKANOVA, A.A. AND TRUNIN, R.F
JETP VOL 11, P.573 (1960)
4) THE AL AND CU ADIABAT WERE OBTAINED BY REFLECTING THE HUGONIOT IN THE P VS UP PLANE. CORRECTIONS WERE MADE FOR FE.
5) OTHER CONSTANTS LISTED ARE: DEBYE TEMPERATURE 580 DEG. K
HEAT CAPACITY (CV) 1.482 J/G/DEG.
CATION TO ANION DISTANCE 2.009 KX
EXPANSION COEFFICIENT 0.000103 PER DEG
6) THE VALUE OF V01 WAS OBTAINED FROM A LATTICE CONSTANT OF 4.0262 A
A.C.A. MONOGRAPH NUMBER 5 (AMERICAN CRYSTALLOGRAPHIC ASSOCIATION, POLYCRYSTAL BOOK SERVICE 1963) 2ND EDITION.

TABLE I

LITHIUM FLUORIDE
98-9---1



98-9---2
LITHIUM FLUORIDE

LI-F SINGLE CRYSTAL

VO = 0.383 CC/G
VOI = 0.3789 CC/G

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN MM/MICROSEC, AND PRESSURE IN KILOBARS.

TABLE

RHOO	US	UFS	UP	P	V/VO	PRESSURE IN AL BASE PL.
2.614	6.40	1.87	0.93	155	0.855	160
2.618	6.61	2.18	1.07	185	0.838	194
2.600	7.28	3.04	1.49	282	0.796	293
2.615	7.47	3.42	1.68	328	0.775	342

US = 5.070 + 1.450 UP MM/MICROSEC
SIGMA US = 0.044

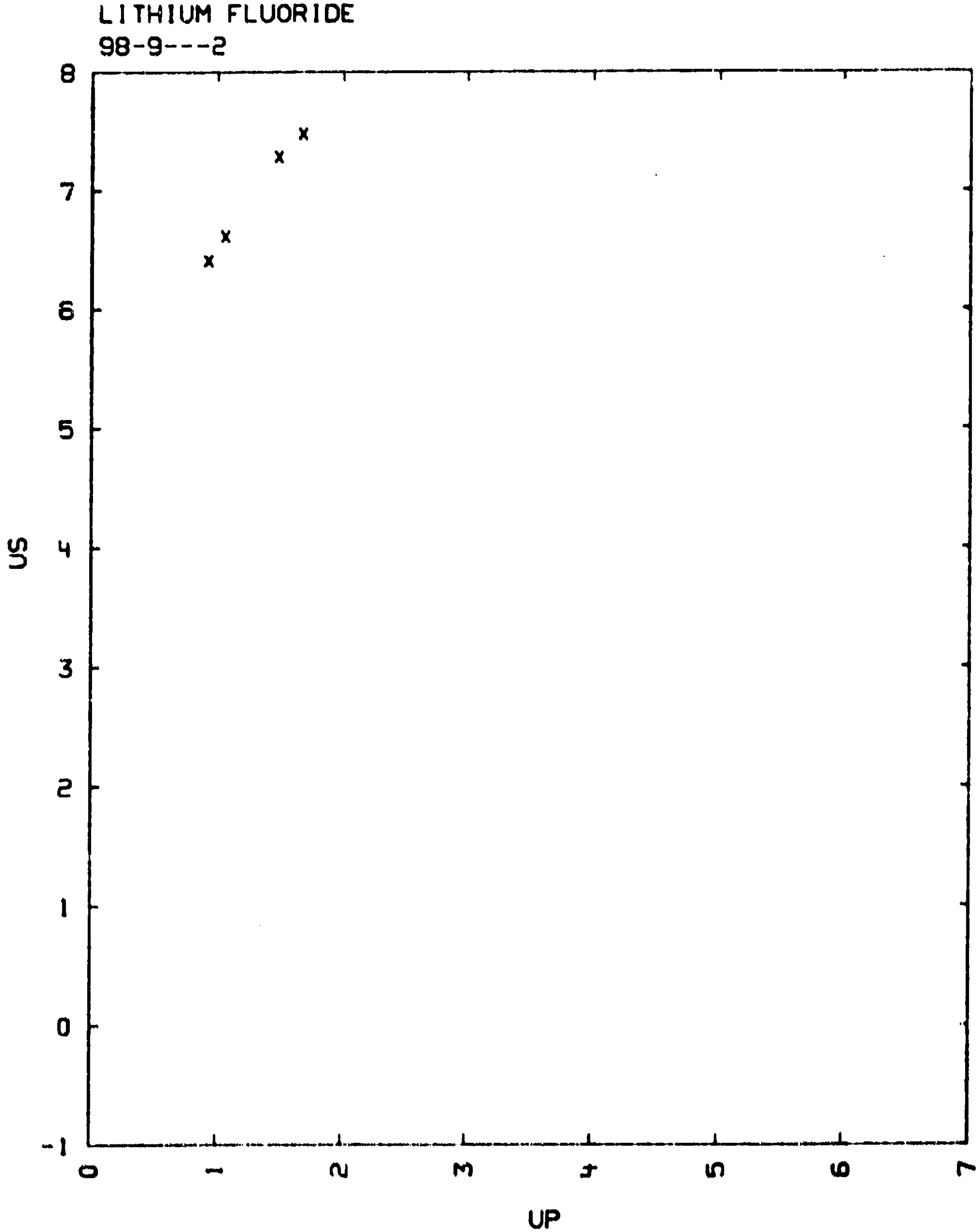
COMMENTS:

1) SOURCE: COMPILER
L. R. L. EQUATION OF STATE FILE
LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA
2) EXPERIMENTAL TECHNIQUE B (ALUMINUM STANDARD BASE PLATE)
DATA REDUCTION TECHNIQUE B.
3) TABULATED DATA ALSO REPORTED BY CHRISTIAN, R.H., IN
EQUATION OF STATE OF ALKALI HALIDES AT HIGH PRESSURE (THESIS)
UCRL-4900 MAY 16, 1957 UNIVERSITY OF CALIFORNIA,
LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA.
4) ALSO LISTED IN REFERENCE OF COMMENT 3 ARE:

DEBYE TEMPERATURE	646 DEG. K
HEAT CAPACITY (CV)	1.53 J/G/DEG.
EXPANSION COEFFICIENT	0.000102 PER DEG.
COMPRESSIBILITY	1.53 PER MEGABAR
MELTING POINT	845 DEG. C

5) THE VALUE OF VOI WAS OBTAINED FROM A LATTICE CONSTANT OF 4.0262 A, AT 25 DEGREES CENTIGRADE.
A.C.A. MONOGRAPH NUMBER 5 (AMERICAN CRYSTALLOGRAPHIC ASSOCIATION, POLYCRYSTAL BOOK SERVICE 1963) 2ND EDITION.

TABLE I



98-9---3
LITHIUM FLUORIDE

LI-F

V0 = 0.3774 CC/G
V01 = 0.3789 CC/G

IN THE TABLES BELOW, DENSITY IS GIVEN IN G/CC., VELOCITIES IN KM/SEC., AND PRESSURE IN KILOBARS. ST DESIGNATES THE STANDARD MATERIAL AND UP(ST) IS THE PARTICLE VELOSITY OF THE STANDARD.

TABLE I
SINGLE CRYSTAL

RHO0	US	UP	P	V/V0	ST	UP(ST)
2.65	8.94	2.87	680	0.680	AL	2.82
-	11.40	4.84	1460	0.575	FE	3.60
-	11.75	5.17	1610	0.559	FE	3.85
-	13.10	6.11	2120	0.535	AL	6.03
-	18.30	10.01	4850	0.452	AL	9.95

US = 5.05 + 1.319 UP KM/SEC. SIGMA US = 0.10 KM/SEC.

V0 = 1.71- 0.566 CC/G.

TABLE II
POROUS

RHO0	US	UP	P	V/V0	ST	UP(ST)
1.71	11.70	6.19	1239	0.471	FE	4.13
1.27	4.52	2.40	138	0.474	AL	1.60
1.27	11.12	6.59	935	0.407	FE	4.13
0.883	10.57	7.03	655	3.35	FE	4.13
0.566	10.21	7.44	430	2.71	FE	4.13

US =

COMMENTS:

1) SOURCE: KORMER, S. B., SINITSYN, M. V., FUNTIKOV, A. I., URLIN, V. D. AND BLINOV, A. V.
SOVIET PHYS-JETP, VOL. 20, P. 811 (1965)
J. EXPTL. THEORET. PHYS. (U.S.S.R.) VOL. 47, P. 1202 (1964)
2) EXPERIMENTAL TECHNIQUE A
DATA REDUCTION TECHNIQUE B
3) V01 WAS CALCULATED USING THE LATTICE CONSTANT OF 4.0262 ANGSTROMS, AT 25 DEGREES CENTIGRADE. SEE CRYSTAL DATA DETERMINATIVE TABLES (AMERICAN CRYSTALLOGRAPHIC ASSOCIATION, 1963) 2ND ED.
4) THE MEASURED EXPERIMENTAL ERROR IN THE SHOCK VELOCITY BELOW 10 KM/SEC IS LESS THAN 1 PERCENT AND FOR THE HIGHER VALUES THE ERROR IS APPROXIMATELY 2 PERCENT. THE VALUE OF THE SHOCK VELOCITY WAS

DETERMINED FROM 5-8 EXPERIMENTS.

5) ADDITIONAL CONSTANTS LISTED:

HEAT CAPACITY = 1.923 JOULES/G/DEG.
BAND GAP = 11.5 EV

6) THE ALUMINUM STANDARD HUGONIOT IS CHARACTERIZED BY THE FOLLOWING RELATIONSHIP: US = 5.254 + 1.458*UP - 0.0276*UP**2 + 0.00103*UP**3
SIGMA US = 0.013 KM/SEC. FOR UP = 0 TO 10.5 KM/SEC
RHOO = 2.71 G/CC.

TABLE I

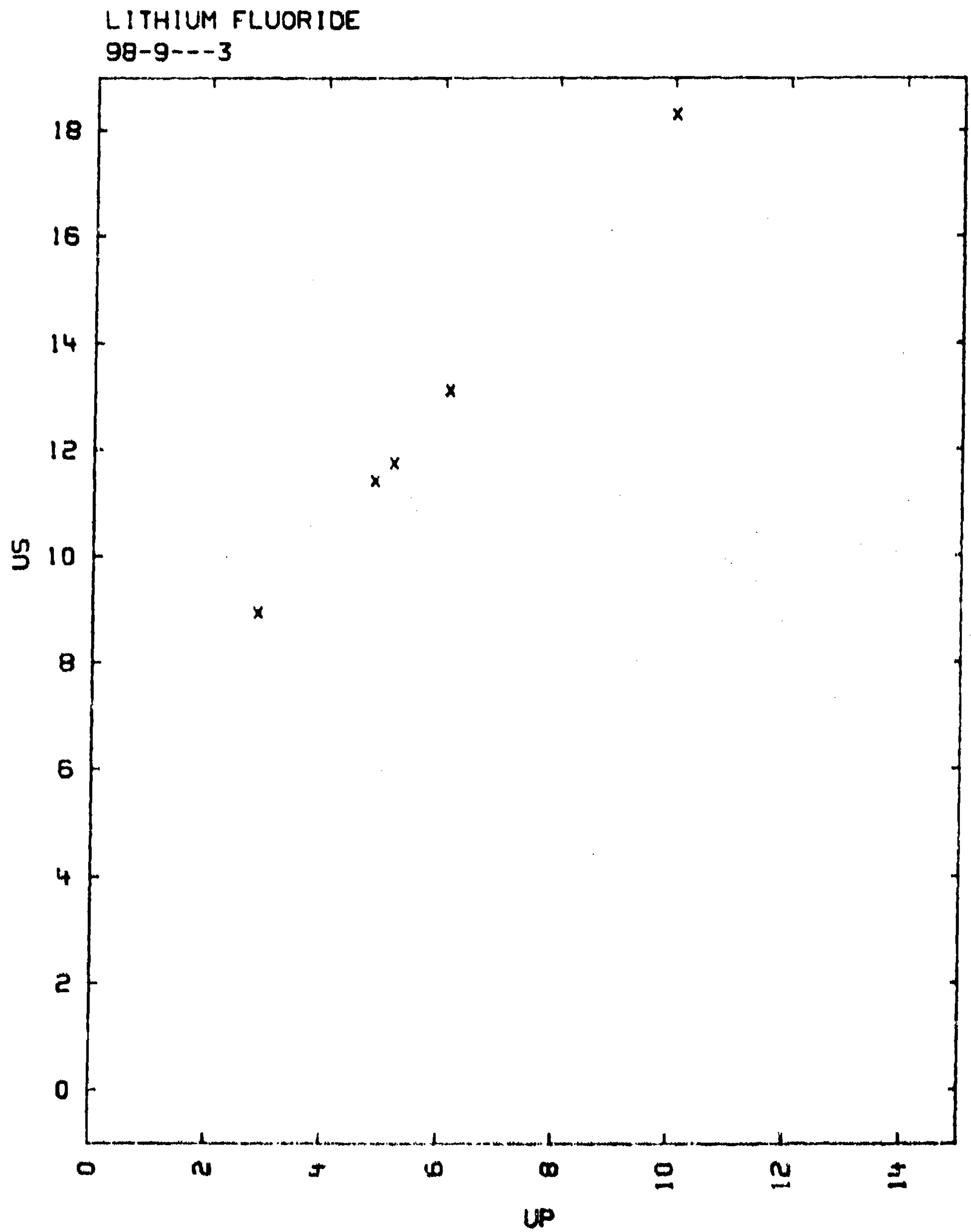
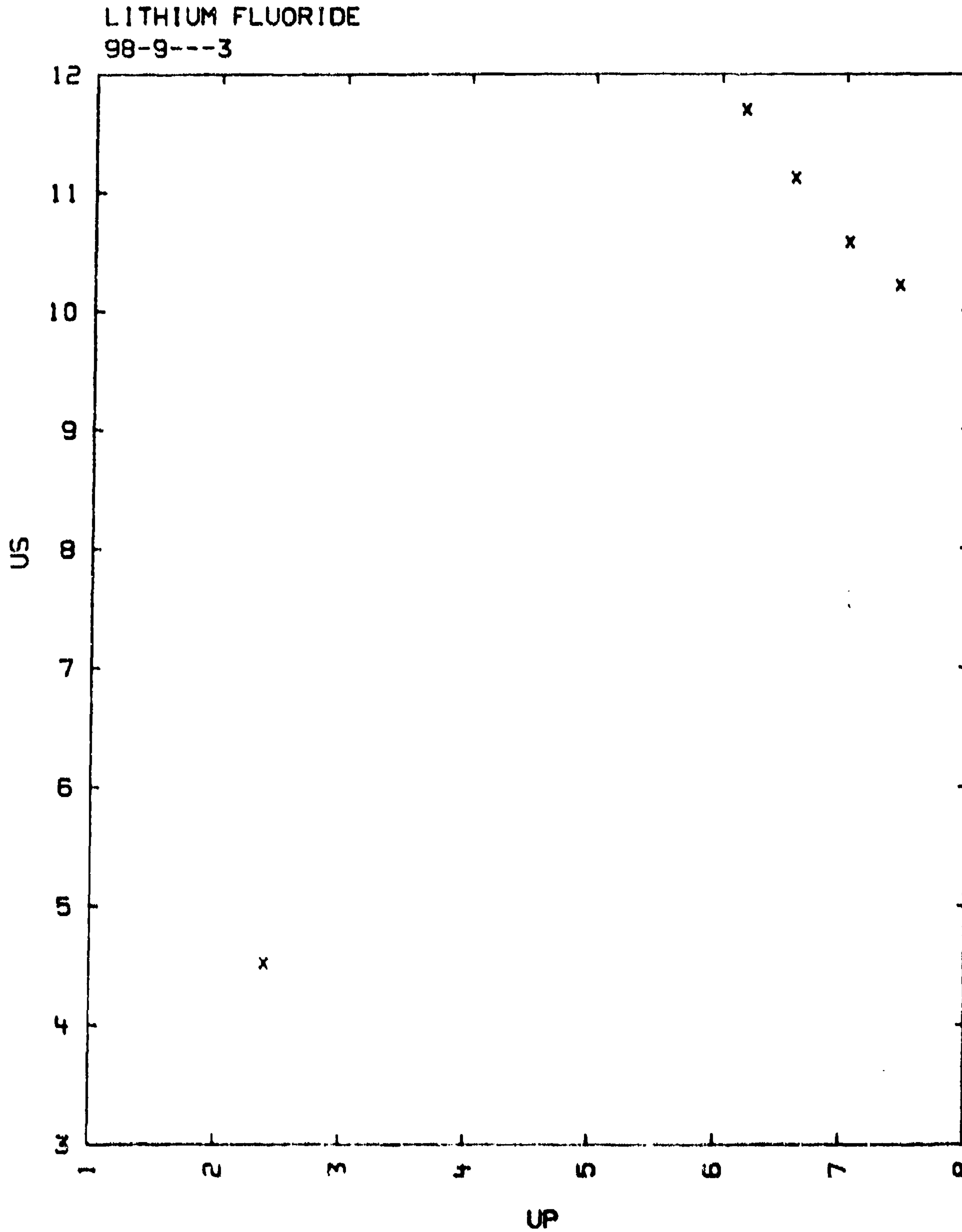


TABLE II



98-9---4
LITHUMFLUORIDE

LI-F

V0 = 0.3792 CC/G.
V0I= 0.3789 CC/G.

THE TABLE LISTS DENSITY IN G/CC, VELOCITIES IN KM/SEC AND PRESSURE IN KBAR. STND = STANDARD MATERIAL, AL = ALUMINUM, PLAL = PLEXIGLAS AND AL.

TABLE

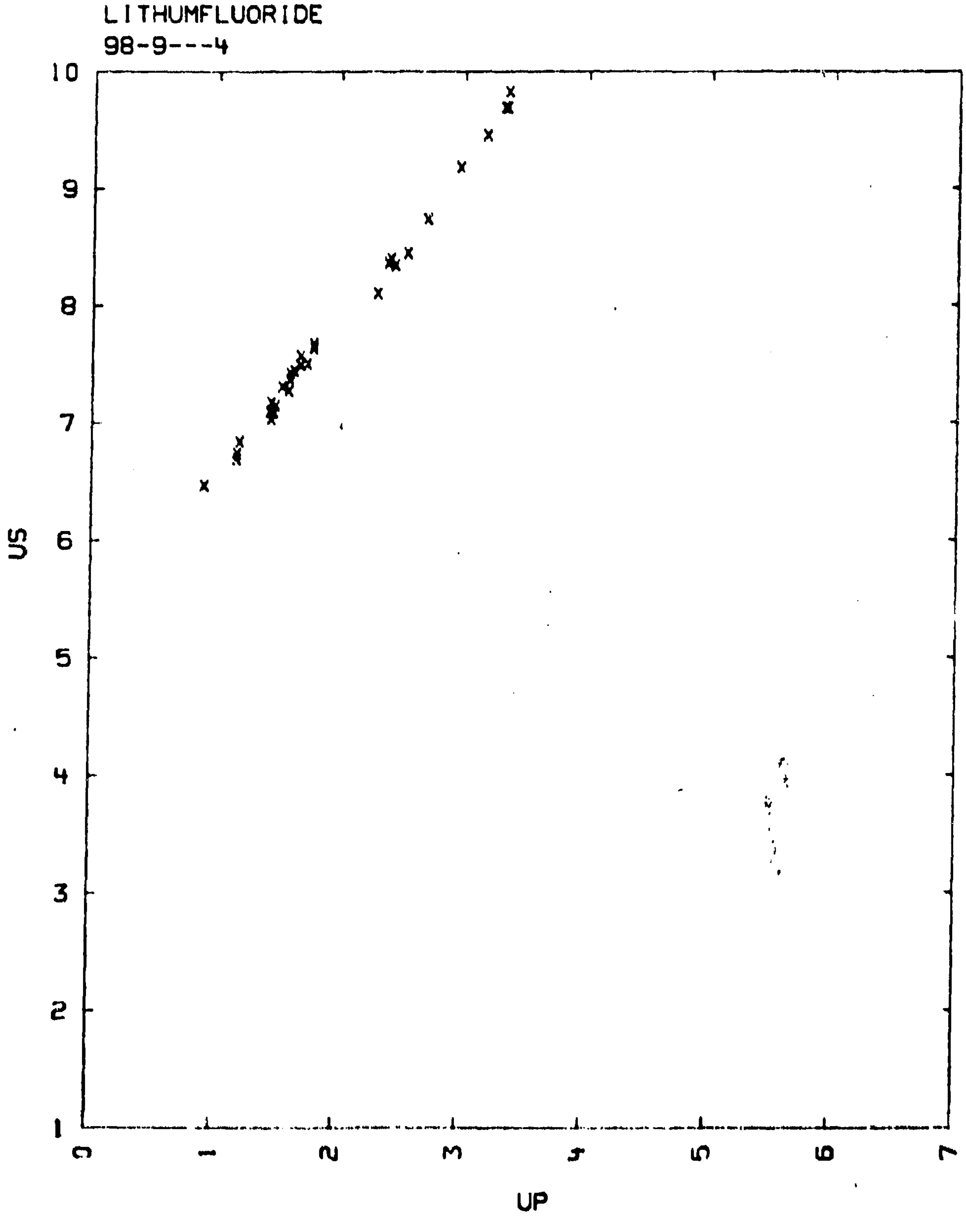
RHO0	US	UP	P	V/V0	STND	DIR
2.637	7.66	1.80	363.	0.765	AL	(100)
-	7.63	1.80	362.	0.764	-	-
-	7.48	1.69	333.	0.774	-	-
-	7.44	1.64	322.	0.780	-	-
-	7.41	1.60	313.	0.784	-	-
-	7.36	1.60	310.	0.783	-	-
-	7.17	1.45	274.	0.790	-	-
-	7.09	1.45	271.	0.795	-	-
-	7.03	1.45	269.	0.794	-	-
-	6.84	1.20	216.	0.824	-	-
-	6.46	0.91	155.	0.859	-	-
-	8.10	2.31	493.	0.715	-	-
-	8.34	2.45	539.	0.706	-	-
-	8.36	2.40	529.	0.713	-	-
-	8.39	2.42	535.	0.712	-	-
-	8.44	2.55	568.	0.698	-	-
-	8.73	2.71	624.	0.690	-	-
-	9.18	2.97	719.	0.676	-	-
-	9.45	3.18	792.	0.663	-	-
-	9.69	3.32	848.	0.657	-	-
-	9.69	3.34	853.	0.655	-	-
-	9.82	3.35	867.	0.659	-	-
-	7.56	1.69	337.	0.776	PLAL	-
-	7.30	1.54	296.	0.789	-	-
-	7.14	1.49	280.	0.791	-	-
-	6.73	1.18	209.	0.824	-	-
-	7.50	1.74	344.	0.768	AL	(111)
-	6.69	1.18	208.	0.824	-	-
-	7.27	1.59	305.	0.781	PLAL	-
-	7.09	1.48	277.	0.791	-	-
-	7.09	1.44	269.	0.797	-	-

US = 5.09 + 1.405*UP KM/SEC. UP LESS THAN 1.9 KM/SEC.
SIG US = 0.06 KM/SEC.
US = 4.59 + 1.537*UP KM/SEC. UP GREATER THAN 2.2 KM/SEC.
SIG US = 0.057 KM/SEC.

COMMENTS:

1) SOURCE: HAUVER, G. E. AND MELANI, A.
PRIVATE COMMUNICATION (1969)
BALLISTICS RESEARCH LABS , ABERDEEN PROVING GROUND, MARYLAND.
2) EXPERIMENTAL TECHNIQUE: H FOR THOSE POINTS MARKED WITH PLAL
CI - - - - - AL
. DATA REDUCTION METHOD: B
3) PLATES OF ALUMINUM AND TITANIUM WITH KNOWN EQUATION OF STATE WERE USED. THE ADIABATIC UNLOADING PATHS IN THE P VS UP PLANE WERE REPRESENTED BY THE REFLECTION OF THE HUGONIOT, SLIGHTLY ADJUSTED TO GO THROUGH THE POINT 0,(UFS+2UP)/2, FOR THOSE POINTS MARKED WITH AL. THE AL CROSS CURVE OF THE POINTS MARKED WITH PLAL WAS LOCATED WITH THE KNOWN P-UP CURVE OF A PLEXIGLAS DISK. FOR THE PLEXIGLAS USED:
US = 2.702+1.544*UP KM/SEC AND RHO0= 1.18 G/CC
SEE HAUVER, G.E. AND MELANI, A. BRL REPORT NO.1259, AUGUST 1964.
4) THE ABOVE TWO LINE FIT IS THE SIMPLEST REPRESENTATION THAT YIELDS A GOOD FIT
5) FURTHER WORK IS IN PROGRESS.
6) V0I WAS CALCULATED FROM A LATTICE CONSTANT OF 4.0282 ANGSTROMS (25 DEG. C.). CRYSTAL DATA DETERMINATIVE TABLES (AMERICAN CRYSTALLOGRAPHIC ASSOCIATION, POLYCRYSTAL BOOK SERVICE, BROOKLYN, N.Y.,1963) 2ND ED

TABLE I



98-10---1
LITHIUM CHLORIDE

LI-CL PRESSED

VO = 0.486 CC/G
VOI = 0.4823 CC/G

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN MM/MICROSEC, AND PRESSURE IN KILOBARS.

TABLE

RHOO	US	UFS	UP	P	V/VO	PRESSURE IN AL BASE PLATE
2.050	5.49	2.37	1.09	121	0.802	162
2.070	5.80	2.86	1.42	170	0.756	225
2.051	6.32	3.79	1.78	230	0.720	303
2.061	6.57	4.24	1.94	263	0.704	345

US = 4.049 + 1.281 UP MM/MICROSEC
SIGMA US = 0.063

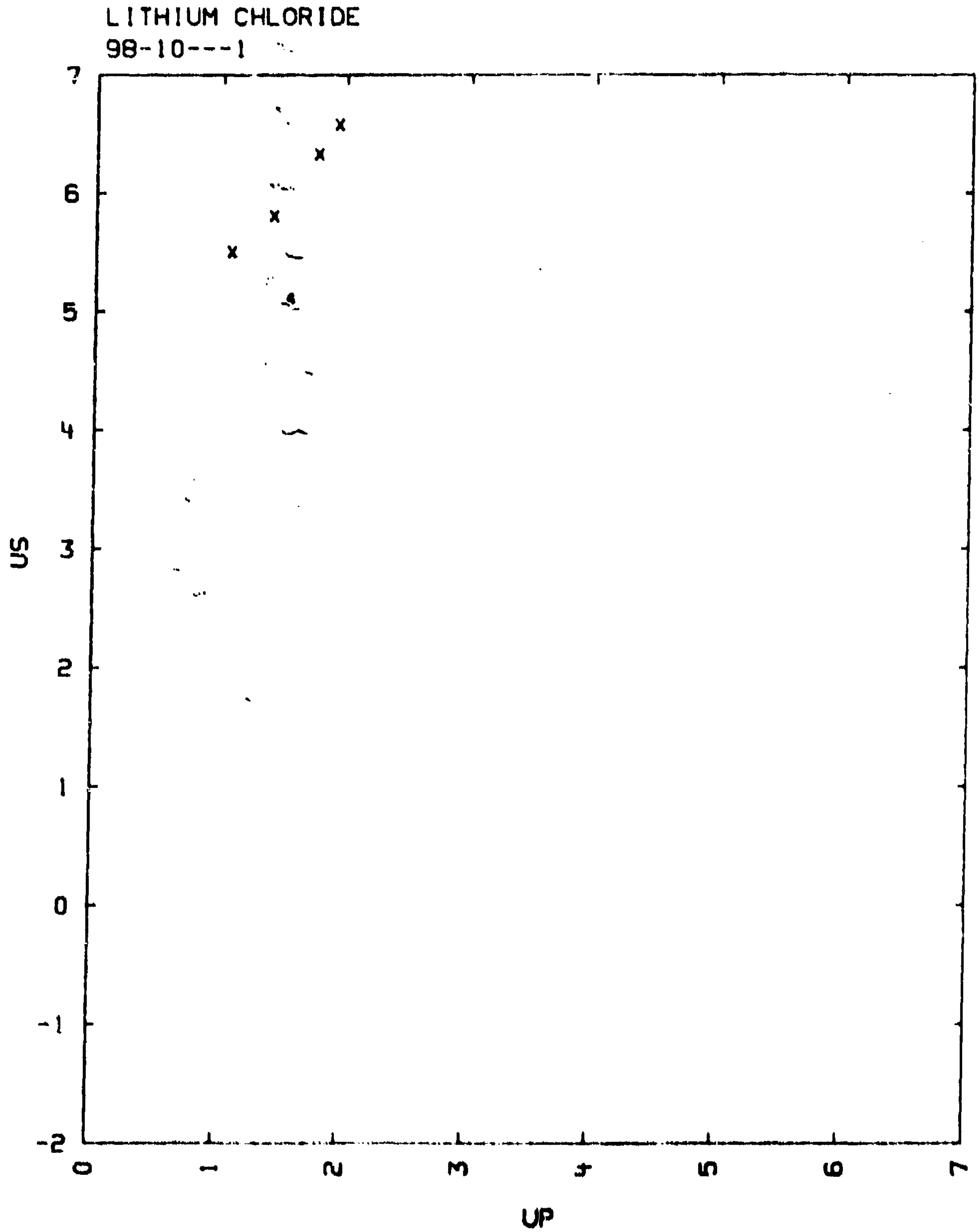
COMMENTS:

1) SOURCE: COMPILER
L. R. L. EQUATION OF STATE FILE
LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA
2) EXPERIMENTAL TECHNIQUE B (ALUMINUM STANDARD BASE PLATE)
DATA REDUCTION TECHNIQUE B.
3) TABULATED DATA ALSO REPORTED BY CHRISTIAN, R.H., IN
EQUATION OF STATE OF ALKALI HALIDES AT HIGH PRESSURE (THESIS)
UCRL-4900 MAY 10, 1957 UNIVERSITY OF CALIFORNIA,
LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA.
4) ALSO LISTED IN REFERENCE OF COMMENT 3 ARE:

DEBYE TEMPERATURE	330 DEG. K
HEAT CAPACITY (CV)	1.11 J/G/DEG.
EXPANSION COEFFICIENT	0.000122 PER DEG.
COMPRESSIBILITY	3.41 PER MEGABAR
MELTING POINT	610 DEG. C

5) THE VALUE OF VOI WAS OBTAINED FROM A LATTICE CONSTANT OF 5.13988 A
A.C.A. MONOGRAPH NUMBER 5 (AMERICAN CRYSTALLOGRAPHIC ASSOCIATION,
POLYCRYSTAL BOOK SERVICE 1963) 2ND EDITION.

TABLE I



98-11---1
LITHIUM BROMIDE

LI-BR PRESSED

VO = 0.297 CC/G
VOI = 0.2886 CC/G

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN MM/MICROSEC, AND PRESSURE IN KILOBARS.

TABLE

RHOO	US	UFS	UP	P	V/VO	PRESSURE IN AL BASE PLATE
3.26	4.12	2.48	1.02	138	0.752	162
3.304	4.51	2.89	1.30	194	0.712	225
3.307	4.96	-	1.63	267	0.671	303
3.30	4.97	-	1.82	298	0.634	345
3.324	4.82	3.36	1.62	260	0.664	299
3.379	3.58	1.81	0.92	111	0.745	139
3.429	4.22	2.42	1.26	186	0.702	215
3.428	5.19	3.62	1.83	326	0.647	363
3.429	3.67	1.39	0.68	86	0.815	103
3.445	4.48	2.86	1.25	192	0.722	218
3.452	5.07	3.52	1.75	306	0.655	341

US = 2.618 + 1.379 UP MM/MICROSEC
SIGMA US = 0.150

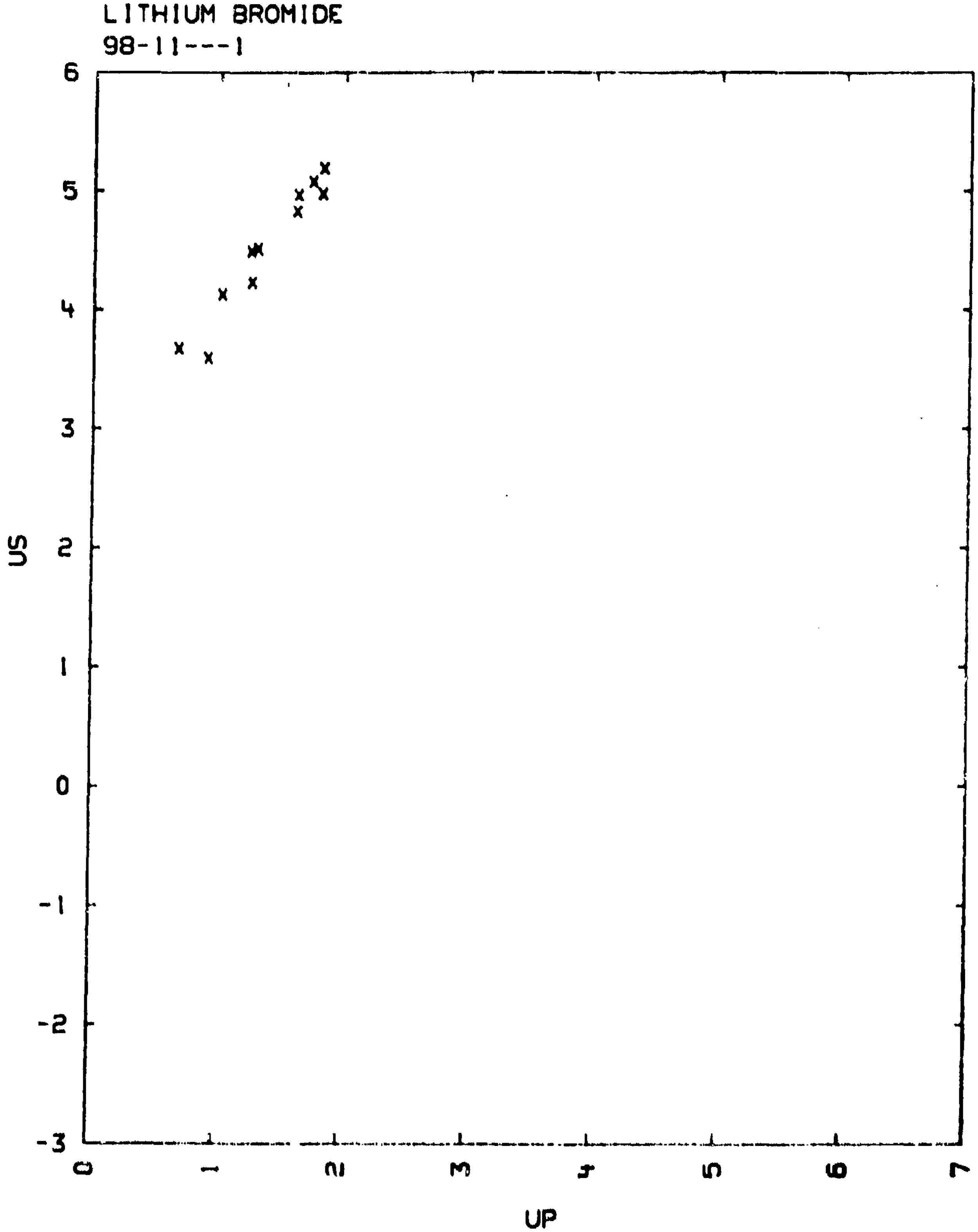
COMMENTS:

1) SOURCE: COMPILER
L. R. L. EQUATION OF STATE FILE
LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA
2) EXPERIMENTAL TECHNIQUE B (ALUMINUM STANDARD BASE PLATE)
DATA REDUCTION TECHNIQUE B.
3) PART OF THE TABULATED DATA ALSO REPORTED BY CHRISTIAN, R. H., IN EQUATION OF STATE OF ALKALI HALIDES AT HIGH PRESSURE (THESIS) UCRL-4900 MAY 16, 1957 UNIVERSITY OF CALIFORNIA, LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA.
4) ALSO LISTED IN REFERENCE OF COMMENT 3 ARE:

DEBYE TEMPERATURE	210 DEG. K
HEAT CAPACITY (CV)	0.56 J/G/DEG.
EXPANSION COEFFICIENT	0.000140 PER DEG.
COMPRESSIBILITY	4.31 PER MEGABAR
MELTING POINT	550 DEG. C

5) THE VALUE OF VOI WAS OBTAINED FROM A LATTICE CONSTANT OF 5.501 A A.C.A. MONOGRAPH NUMBER 5 (AMERICAN CRYSTALLOGRAPHIC ASSOCIATION, POLYCRYSTAL BOOK SERVICE 1963) 2ND EDITION.

TABLE I



98-12---1
LITHIUM IODIDE

LI-I SINGLE CRYSTAL

VO = 0.249 CC/G
VOI = 0.2444 CC/G

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN MM/MICROSEC, AND PRESSURE IN KILOBARS.

TABLE

RHOO	US		UP	P	V/VO	PRESSURE IN AL BASE PLATE
4.016	4.01	-	1.27	205	0.683	227
4.008	4.24	-	1.58	268	0.628	296
4.016	4.47	-	1.78	320	0.602	352

US = 2.869 + 0.888 UP MM/MICROSEC
SIGMA US= 0.040

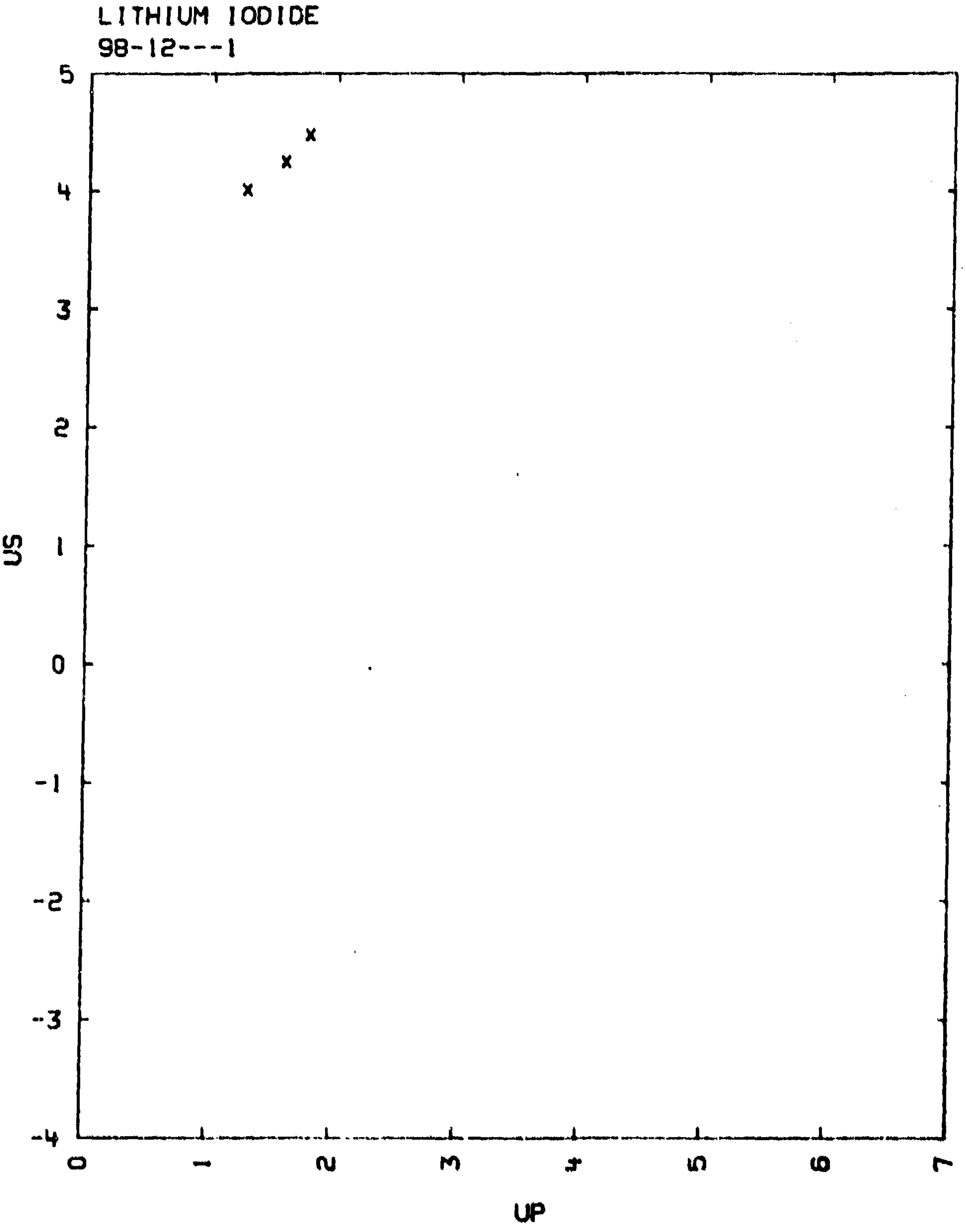
COMMENTS:

1) SOURCE: CHRISTIAN, R. H.
REPORT NO. UCRL-4900 (1957)
EQUATION OF STATE OF ALKALI HALIDES AT HIGH PRESSURE (THESIS)
LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA
2) EXPERIMENTAL TECHNIQUE B (ALUMINUM STANDARD BASE PLATE)
DATA REDUCTION TECHNIQUE B.
3) ALSO LISTED IN REFERENCE OF COMMENT 1 ARE:

DEBYE TEMPERATURE	100 DEG. K
HEAT CAPACITY (CV)	0.37 J/G/DEG.
EXPANSION COEFFICIENT	0.000167 PER DEG.
COMPRESSIBILITY	6.01 PER MEGABAR
MELTING POINT	465 DEG. C

5) THE VALUE OF VOI WAS OBTAINED FROM A LATTICE CONSTANT OF 6.012 A
A.C.A. MONOGRAPH NUMBER 5 (AMERICAN CRYSTALLOGRAPHIC ASSOCIATION, POLYCRYSTAL BOOK SERVICE 1963) 2ND EDITION.

TABLE I



98-12---2
LITHIUM IODIDE

LI-I PRESSED

VO = 0.302 - 0.263 CC/G
VOI = 0.2444 CC/G

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN MM/MICROSEC, AND PRESSURE IN KILOBARS.

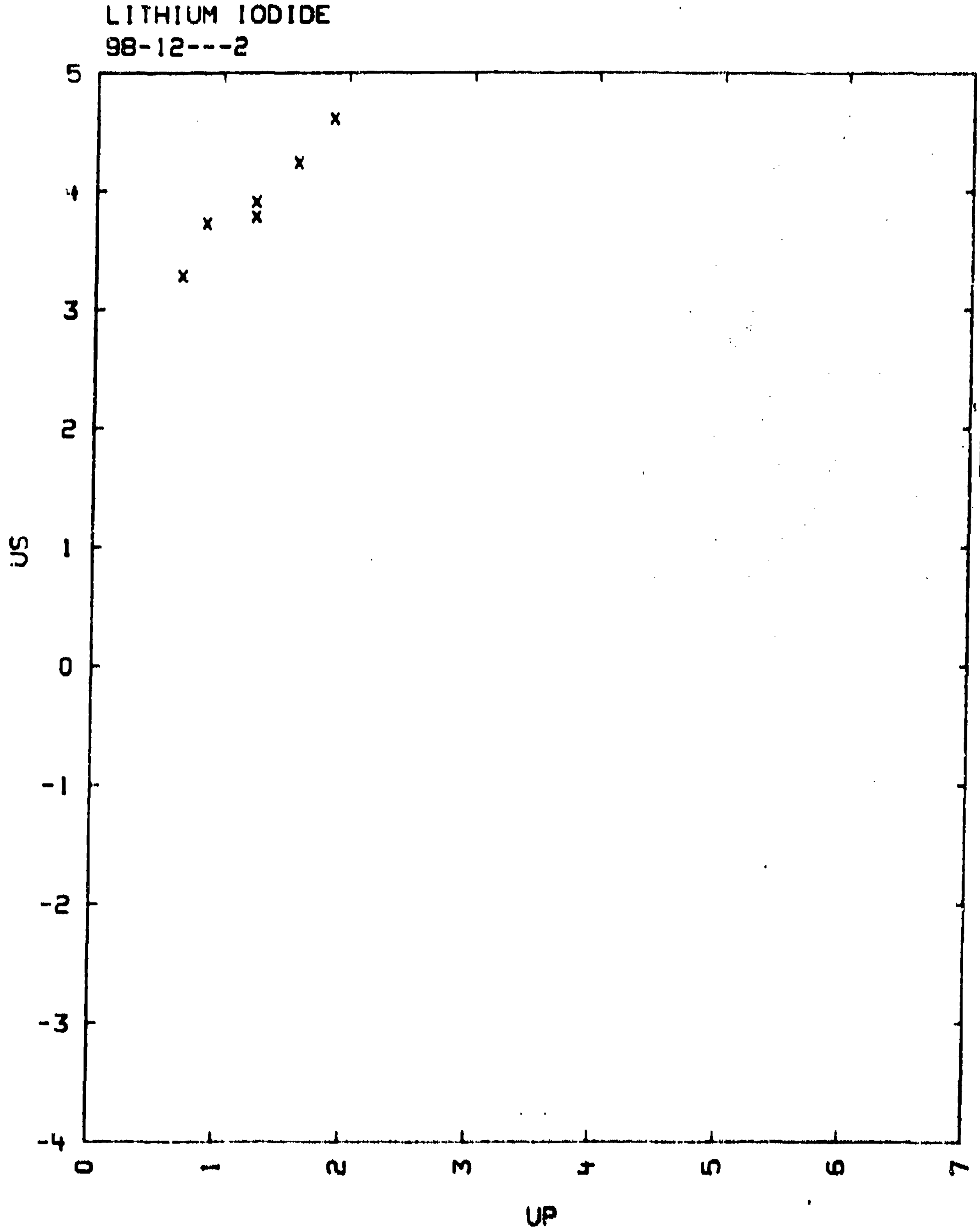
TABLE

RHOO	US	UFS	UP	P	V/VO	PRESSURE IN AL BASE PLATE
3.313	4.81	-	1.88	288	0.593	340
3.486	3.72	2.09	0.89	116	0.761	139
3.809	4.23	3.79	1.61	259	0.619	295
3.761	3.78	2.55	1.27	181	0.664	215
3.797	3.28	1.41	0.69	85	0.791	103
3.747	3.90	2.93	1.27	186	0.674	216

US =

COMMENTS:

1) SOURCE: COMPILER
L. R. L. EQUATION OF STATE FILE
LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA
2) EXPERIMENTAL TECHNIQUE B (ALUMINUM STANDARD BASE PLATE)
DATA REDUCTION TECHNIQUE B.
3) THE VALUE OF VOI WAS OBTAINED FROM A LATTICE CONSTANT OF 6.012 A
A.C.A. MONOGRAPH NUMBER 5 (AMERICAN CRYSTALLOGRAPHIC ASSOCIATION, POLYCRYSTAL BOOK SERVICE 1963) 2ND EDITION.


LITHIUM IODIDE
98-12---2
5
4
3
2
1
0
-1
-2
-3
-4
US
0
1
2
3
4
5
6
7
UP

99-9---1
SODIUM FLUORIDE

NA-F PRESSED

VO = 0.362 CC/G
VOI = 0.3554 CC/G

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN MM/MICROSEC, AND PRESSURE IN KILOBARS.

TABLE

RHOO	US	UFS	UP	P	V/VO	PRESSURE IN AL BASE PLATE
2.727	4.60	0.97	0.50	63	0.891	74
2.768	5.45	1.90	0.96	144	0.825	161
2.773	5.68	2.52	1.24	196	0.781	220
2.774	6.12	3.47	1.78	302	0.709	343
2.773	6.27	3.17	1.54	268	0.754	293
2.779	5.20	1.48	0.76	110	0.853	124

US = 4.172 + 1.223 UP MM/MICROSEC
SIGMA US = 0.195

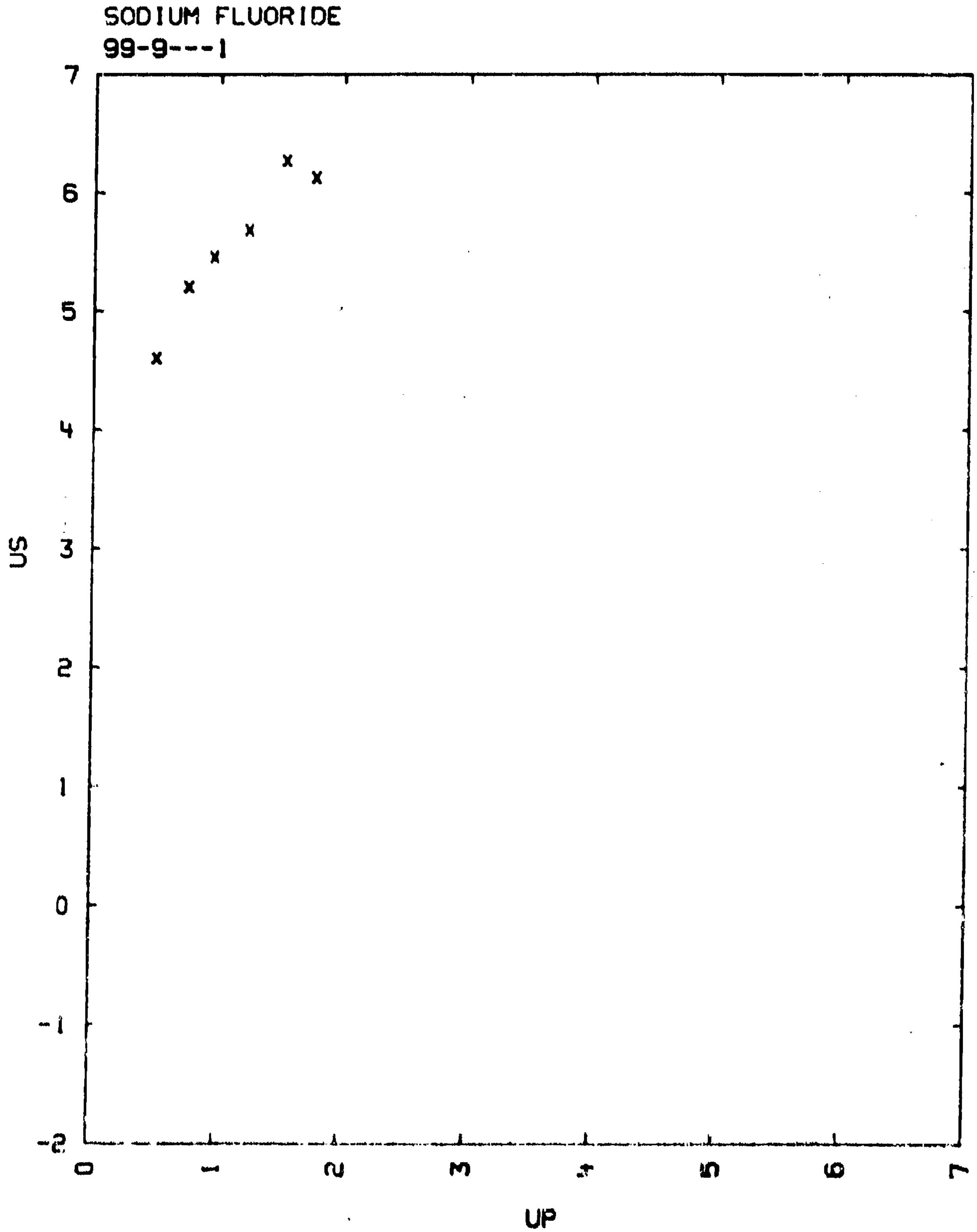
COMMENTS:

1) SOURCE: COMPILER
L. R. L. EQUATION OF STATE FILE
LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA
2) EXPERIMENTAL TECHNIQUE B (ALUMINUM STANDARD BASE PLATE)
DATA REDUCTION TECHNIQUE B.
3) THE FOLLOWING DATA WAS OBTAINED FROM CHRISTIAN, R. H., EQUATION OF STATE OF ALKALI HALIDES AT HIGH PRESSURE (THESIS) UCRL-4900 MAY 16, 1957. UNIVERSITY OF CALIFORNIA LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA:

DEBYE TEMPERATURE	439 DEG. K
HEAT CAPACITY (CV)	1.06 J/G/DEG.
EXPANSION COEFFICIENT	0.000098 PER DEG.
COMPRESSIBILITY	2.11 PER MEGABAR
MELTING POINT	995 DEG. C

4) THE VALUE OF VOI WAS OBTAINED FROM A LATTICE CONSTANT OF 4.628 A
A.C.A. MONOGRAPH NUMBER 5 (AMERICAN CRYSTALLOGRAPHIC ASSOCIATION, POLYCRYSTAL BOOK SERVICE, BROOKLYN, N.Y., 1963) 2ND ED.

TABLE I



99-10---0
SODIUMCHLORIDE SUMMARY

NA-CL.

VO = 0.463 - 1.01 CC/G
VOI= 0.4622 CC/G

CO = 3.380 KM/SEC

THE TABLE LISTS HUGONIOT POINTS CALCULATED FROM THE FITS GIVEN BELOW.
UNITS ARE: G/CC, KM/SEC, KBAR, AND KBAR.CC/G FOR THE ENERGY DIFFERENCE.
TP = TRANSITION POINT.

TABLE

FIT	RHOO	US	UP	P	V/VO	E-EO	COMMENTS
1	2.165	4.147	.5	44.9	0.879	1.25	SOLID
	-	4.889	1.0	105.	0.798	5.0	-
	-	5.630	1.5	183.	0.734	11.2	-
	-	5.868	1.66	211.	0.717	13.8	TP 111 AXIS
	-	6.298	1.95	266.	0.690	19.0	TP 100 AXIS
2	-	6.271	2.2	299.	0.649	24.2	SOLID
	-	6.776	2.6	381.	0.616	33.8	-
	-	7.282	3.0	473.	0.588	45.0	-
3	-	7.890	3.2	547.	0.594	51.2	LIQUID
	-	8.407	3.6	655.	0.572	64.8	-
	-	8.924	4.0	773.	0.552	80.0	-
	-	10.216	5.0	1106.	0.511	125.	-
	-	12.154	6.5	1710.	0.465	211.	-
4	-	11.794	6.8	1336.	0.423	231	-
	-	13.450	8.2	2308.	0.390	336	-
	-	15.107	9.6	3140.	0.364	461	-
	-	16.763	11.0	3992.	0.344	605	-
5	1.43	4.721	2.0	135.	0.576	20.0	
	-	6.123	3.0	263.	0.510	45.0	
	-	7.526	4.0	430.	0.468	80.	
	-	10.331	6.0	886.	0.419	180.	
	.991	3.721	2.0	73.8	.462	20.0	
	-	5.157	3.0	153.	.418	45.0	
	-	8.030	5.0	398.	.377	125.	
	-	10.903	7.0	756.	.358	245.	

US = 3.406 + 1.483*UP, SIG.US = 0.06 KM/SEC (FOR FIT 1)
FOR UP BETWEEN .4 AND 2 (COMMENT 2 AND 3)
US = 3.49 + 1.264*UP, SIG.US = 0.11 KM/SEC (FOR FIT 2)
FOR UP BETWEEN 2.2 AND 3.0
US = 3.756 + 1.292*UP, SIG.US = 0.11 KM/SEC (FOR FIT 3)
FOR UP BETWEEN 3.2 AND 6.5
US = 3.75 + 1.183*UP, SIG.US = 0.07 KM/SEC (FOR FIT 4)

FOR UP BETWEEN 6.8 AND 11.

US = 3.426 + 1.346*UP - 1.82(2.165-RHO0) + 0.077(2.165-RHO0)UP
- 0.32 (2.165-RHO0)**2

SIG.US = 0.11 KM/SEC (FOR FIT 5)
FOR UP BETWEEN THE LIMITS OF THE TABLE

COMMENTS :

1) SOURCE: COMPILER
DATA SOURCES WERE USED AS FOLLOWS:

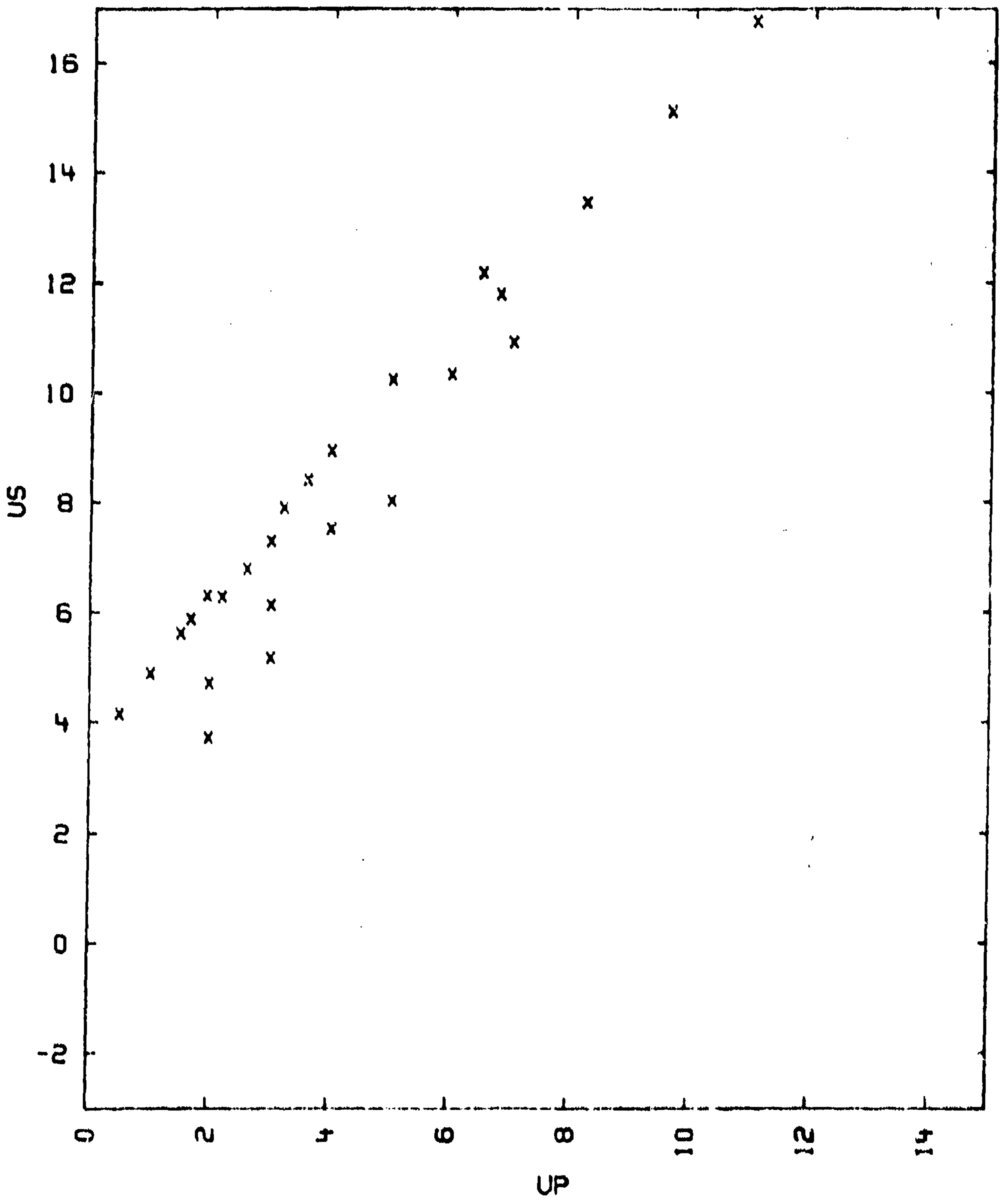
PAGES	99-10---2,3 AND 4	FIT 1 AND 2
-	99-10---1,3,4 AND5	FIT 3
-	99-10---5	FIT 4
-	99-10---1 AND 5	FIT 5

2) SIGNIFICANCE OF THE FITS:
FIT 1: SOLID PHASE, ORIGINAL NA-CL STRUCTURE
- 2: - - CS-CL STRUCTURE : THE ONLY EVIDENCE FOR PLACING THE PHASE CHANGE THIS HIGH, IS THE RATE OF INCREASE OF THE TRANSFORMATION PRESSURE IN K-CL WHEN NA-CL IS ADDED.
S. WIEDERHORN AND H. G DRICKAMER J. APPL. PHYS., V. 31, P. 1665 (1960).
FIT 3: LIQUID PHASE AND MIXED LIQUID-SOLID PHASES:
KORMER, S. B. ET AL., Z. EKSP. TEO. FIZIKI, V. 48, P. 1033 (1965)
FIT 4: VERY HIGH PRESSURE DATA OF 99-10---5, CHANGE IN SLOPE COULD BE DUE TO ELECTRONIC EXCITATION.
FIT 5: USEFUL FOR POROUS SAMPLES. POROUS DATA DO NOT SHOW THE TRANSITIONS.

3) DATA OF 99-10---2 AND 3 SHOW THE TRANSITION POINT AT UP = 2.05 AND 1.94 RESPECTIVELY FOR SHOCKS TRAVELING ALONG THE 100 CRYSTAL AXIS. UP = 1.66 IS THE ESTIMATED TRANSFORMATION POINT FOR FOR SHOCKS ALONG THE 111 DIRECTION.

TABLE I

SODIUMCHLORIDE SUMMARY
99-10---0



99-10---1
SODIUM CHLORIDE

NA-CL

VO = 0.463 CC/G
VOI = 0.4617 CC/G   CB = 3.32 KM/SEC

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN KM/SEC AND PRESSURE IN KILOBARS. SH DESIGNATES SAMPLE HOLDER.

TABLE

RHOO	US	UP	P	V/VO	SH	UP(SH)
2.16	4.16	0.59	53	0.862	CU	0.37
-	4.73	0.98	100	0.794	AL	0.70
-	5.29	1.33	152	0.748	AL	1.10
-	5.41	1.55	182	0.719	FE	1.03
-	5.59	1.59	193	0.714	AL	1.32
-	5.66	1.71	209	0.699	AL	1.42
-	5.96	1.85	236	0.690	AL	1.54
-	6.18	2.07	276	0.667	AL	1.74
-	7.35	3.24	547	0.588	AL	2.80
-	8.91	4.10	790	0.540	FE	2.80

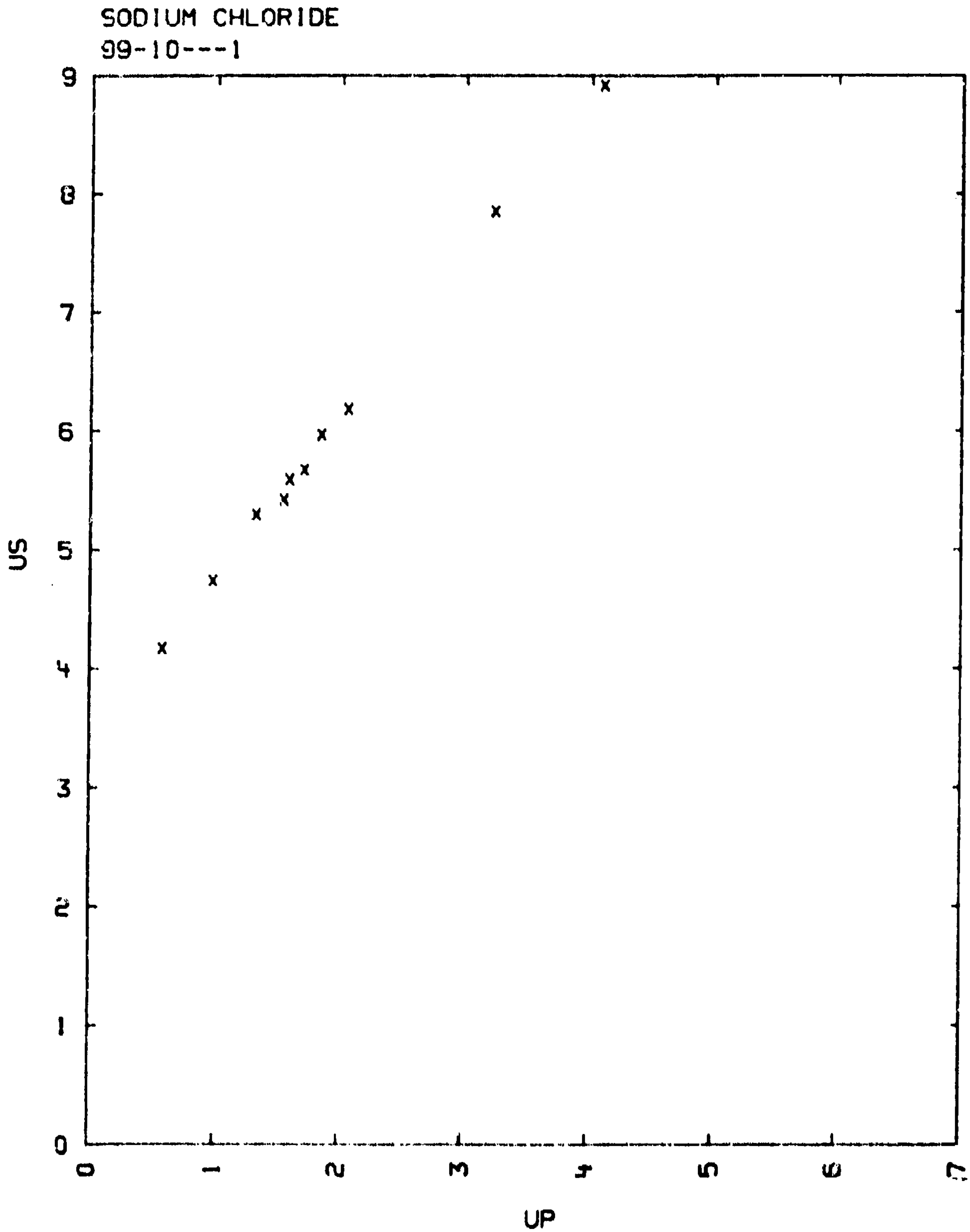
US = 3.40 + 1.35 UP KM/SEC   FOR UP BETWEEN 0.6 AND 4.1 KM/SEC
SIG US = 0.06

COMMENTS:

1) SOURCE: AL'TSHULER, L.V., KULESHOVA, L.V. AND PAVLOVSKII, M.N.
SOVIET PHYS.-JETP, VOL. 12, P. 10 (1961)
2) EXPERIMENTAL TECHNIQUE A
DATA REDUCTION TECHNIQUE B.
3) THE SAMPLES WERE POSITIONED ON PLATES OF CU, AL AND FE AS INDICATED IN COLUMN 6 AND 7 OF THE TABLE.
4) THE HUGONIOTS OF THESE PLATE MATERIALS WERE TAKEN FROM AL'TSHULER, L.V., KORMER, S.B., BAKANOVA, A.A., AND TRUNIN, R.F. SOVIET PHYSICS JETP VOL 11, P. 573 (1960)
THE UNLOADING ADIABATS WERE OBTAINED BY REFLECTING THE HUGONIOT IN THE PRESSURE PARTICLE VELOCITY PLANE.
5) CB AS WELL AS THE DEBYE TEMPERATURE 281 DEG. K
HEAT CAPACITY (CV) 0.821 J/G/DEG.
EXPANSION COEFFICIENT 0.000116 PER DEG.
CATION TO ANION DISTANCE 2.814 KX

WERE OBTAINED FROM AL'TSHULER, L.V., PAVLOVSKII, M.N. AND KULESHOVA, L.V. SOVIET PHYSICS-SOLID STATE VOL. 5, P. 203 (1963)
6) THE VALUE OF VOI LISTED WAS OBTAINED FROM A CATION TO ANION DISTANCE OF 2.820 A. SEE A.C.A. MONOGRAPH NUMBER 5 (AMERICAN CRYSTALLOGRAPHIC ASSOCIATION, POLYCRYSTAL BOOK SERVICE, BROOKLYN 1963) 2ND ED.

TABLE I



99-10---2
SODIUM CHLORIDE

NA-CL SINGLE CRYSTAL

VO = 0.463 CC/G
VOI = 0.4622 CC/G

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN KM/SEC AND PRESSURE IN KBARS. STND=STANDARD MATERIALS THAT DETERMIN THE PRESSURE: PLAL: PLEXIGLASS DEFINES THE AL CROSS-CURVE. AL: ALUMINUM STANDARD ONLY. DIR = SHOCK DIRECTION. DEG=DEGREES.

TABLE

RHOO	US	UP	P	V/VO	STND	DIR
2.16	4.92	1.06	110.	0.789	PLAL	(100)
-	4.94	1.08	113.	0.785	-	-
-	4.95	1.05	111.	0.790	-	-
-	4.96	1.09	115.	0.784	-	-
-	5.07	1.10	120.	0.783	-	-
-	5.14	1.17	128.	0.776	-	-
-	5.21	1.26	141.	0.760	-	-
-	5.29	1.32	147.	0.756	-	-
-	5.40	1.34	156.	0.752	-	-
-	5.43	1.42	166.	0.738	-	-
-	5.46	1.44	170.	0.736	-	-
-	5.48	1.41	167.	0.743	-	-
-	5.52	1.41	168.	0.744	-	-
-	5.61	1.56	189.	0.722	-	-
-	5.62	1.46	177.	0.740	-	-
-	5.62	1.50	182.	0.733	-	-
-	5.72	1.54	190.	0.731	-	-
-	5.82	1.69	212.	0.710	-	-
-	5.86	1.69	214.	0.712	-	-
-	5.87	1.71	217.	0.709	-	-
-	5.88	1.60	215.	0.714	-	-
-	5.88	1.73	220.	0.706	-	-
-	5.91	1.69	216.	0.714	-	-
-	5.98	1.73	223.	0.711	-	-
-	6.10	1.85	244.	0.697	-	-
-	6.20	1.95	261.	0.685	-	-
-	6.24	2.02	272.	0.676	-	-
-	5.84	1.74	219.	0.702	AL	-
-	5.93	1.68	215.	0.717	-	-
-	6.15	1.92	255.	0.688	-	-
2.16	6.33	2.05	280.	0.676	-	-
-	6.37	2.14	294.	0.664	-	-
-	6.43	2.36	328.	0.633	-	-
-	6.44	2.27	316.	0.647	-	-
-	6.45	2.39	333.	0.629	-	-
-	6.55	2.46	348.	0.624	-	-
-	6.74	2.50	304.	0.629	-	-
-	6.79	2.62	384.	0.614	-	-

SODIUM CHLORIDE

RHOO	US	UP	P	V/VO	STND	DIR	
-	6.81	2.66	391.	0.609	-	-	
-	6.88	2.66	395.	0.613	-	-	
-	6.95	2.75	413.	0.604	-	-	
-	6.99	2.76	417.	0.605	-	-	
-	7.01	2.80	424.	0.600	-	-	
-	7.15	2.91	449.	0.593	-	-	
-	7.27	2.96	465.	0.593	-	-	
-	7.43	3.08	494.	0.585	-	-	
-	7.71	3.20	533.	0.585	-	-	
-	7.95	3.33	572.	0.581	-	-	
-	8.22	3.56	632.	0.567	-	-	
-	8.54	3.70	682.	0.567	-	-	
-	8.59	3.71	688.	0.568	-	-	
-	4.75	0.88	90.	0.815	PLAL	(111)	
-	5.00	1.04	112.	0.792	-	-	
-	5.48	1.41	167.	0.743	-	-	
-	5.72	1.54	190.	0.731	-	-	
-	5.81	1.66	208.	0.714	-	-	
-	5.94	1.97	253.	0.668	-	-	
-	5.95	1.71	220.	0.713	-	-	
-	5.98	1.81	234.	0.697	-	-	
-	6.01	2.03	264	0.662	-	-	
-	6.06	2.05	268.	0.662	-	-	
-	5.74	1.61	200.	0.720	AL	-	
-	5.86	1.78	225.	0.696	-	-	
-	5.99	1.95	252.	0.674	-	-	
-	6.00	1.92	249.	0.680	-	-	+10 DEG
-	6.06	1.95	255.	0.678	-	-	- -
-	6.08	1.80	236.	0.704	-	-	- -
-	6.25	2.20	297.	0.648	-	-	- -
-	6.42	2.38	330.	0.629	-	-	- -
-	6.90	2.65	395.	0.616	-	-	- -
2.16	4.70	0.80	89.	0.813	PLAL	(110)	
-	5.36	1.29	149.	0.759	-	-	
-	5.43	1.42	166.	0.738	-	-	
-	5.22	1.20	145.	0.753	-	(112)	
-	5.36	1.36	157.	0.746	-	-	

US = 3.52 + 1.382*KM/SEC. NACL STRUCTURE, UP LESS THAN 2.06
SIG US = 0.047 KM/SEC.
US = 3.26 + 1.35*UP KM/SEC. UP BETWEEN 2.2 AND 3.0 KM/SEC.
SIG US = 0.045 KM/SEC.
US = 2.43 + 1.65*UP KM/SEC. UP GREATER THAN 3.1 KM/SEC.
SIG US = 0.055 KM/SEC.

COMMENTS:

1) SOURCE: HAUVER, G. E. AND MELANI, A.

B.R.L. REPORT BRL MR 2061 (1970)
BALLISTICS RESEARCH LABS., ABERDEEN PROVING GROUND,
MARYLAND, USA.

2) EXPERIMENTAL TECHNIQUE: H FOR THOSE POINTS MARKED WITH PLAL
C1 - - - - - AL
DATA REDUCTION METHOD: B

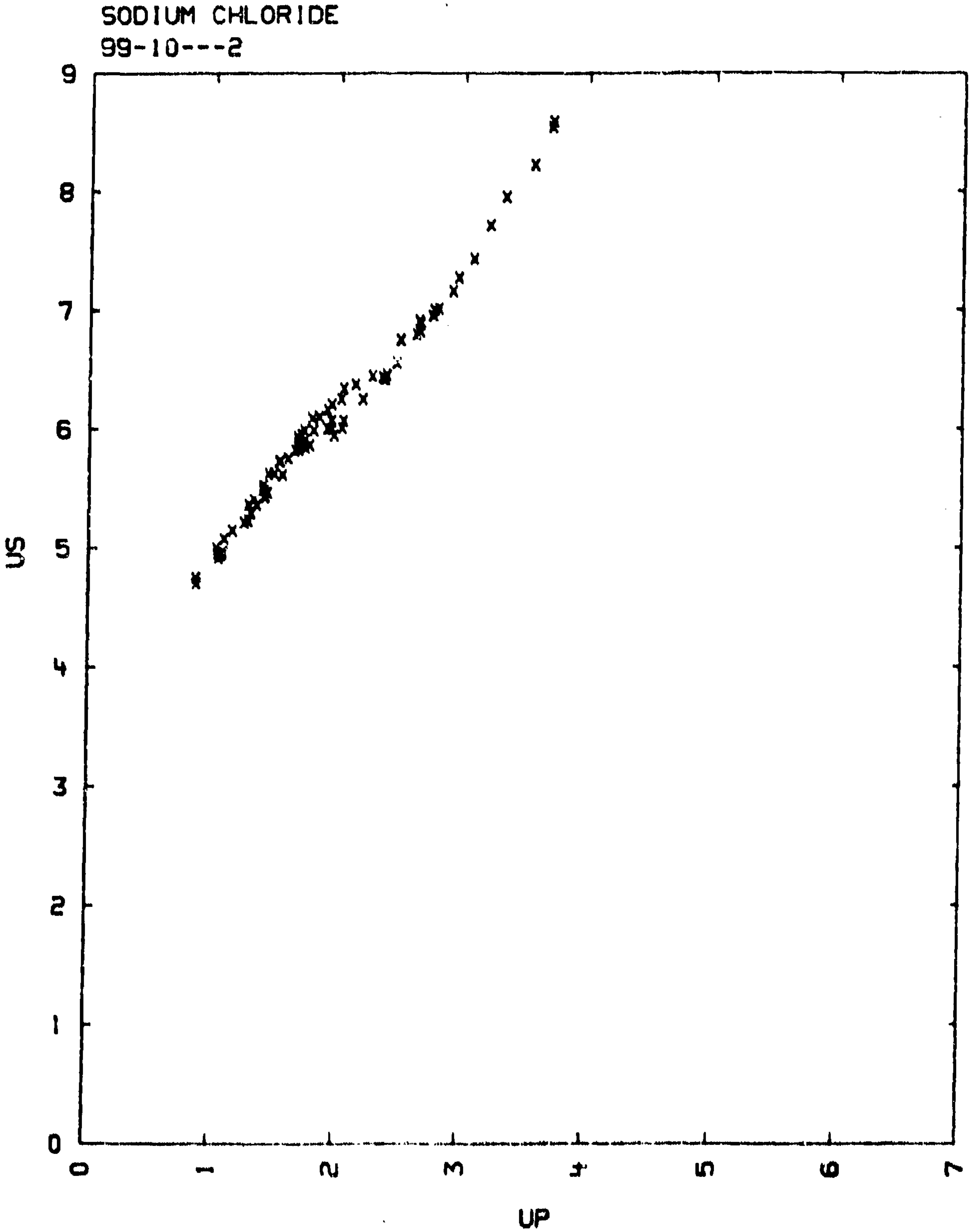
3) THE AL CROSS CURVE OF THE POINTS MARKED WITH PLAL WAS LOCATED WITH THE KNOWN P-UP CURVE OF A PLEXIGLAS DISK. FOR THE PLEXIGLAS USED:
US = 2.695+1.538*UP KM/SEC AND RHOO= 1.18 G/CC
SEE HAUVER, G.E. AND MELANI, A. BRL REPORT NO.1259, AUGUST 1964.

4) A TRANSITION IS OBSERVED AT P = 280 KILOBARS. FOR SHOCKS IN THE (100) DIRECTION AND AT 220. KBARS IN THE (111) DIRECTION.

5) FURTHER WORK IS IN PROGRESS.

6) THE VALUE OF V01 WAS OBTAINED FROM A CATION TO ANION DISTANCE OF 2.820 A. SEE A.C.A. MONOGRAPH NUMBER 5 (AMERICAN CRYSTALLOGRAPHIC ASSOCIATION, POLYCRYSTAL BOOK SERVICE, BROOKLYN 1963) 2ND ED.

TABLE I



99-10---3
SODIUM CHLORIDE

NA-CL SINGLE CRYSTAL

100 AXIS
VO = 0.464 CC/G CL = 4.75 KM/SEC CO = 3.42 KM/SEC
CS = 2.40 KM/ SEC

111 AXIS
VO = 0.463 CC/G CL = 4.42 KM/SEC CO = 3.42 KM/SEC
CS = 2.72 KM/SEC
VOI = 0.4622 CC/G

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN MM/MICROSEC, AND PRESSURE IN KILOBARS.

TABLE

AXIS	RHOO	US	UFS	UP	P	V/VO	PRESSURE IN AL BASE PLATE
100	2.159	5.94	3.45	1.73	222	0.710	294
100	2.160	5.07	2.22	1.10	120	0.783	162
100	2.154	6.06	3.80	1.86	243	0.693	320
100	2.163	6.24	-	1.97	266	0.684	368
100	2.153	9.03	9.40	4.07	791	0.549	1090
100	2.152	7.72	6.22	3.21	533	0.584	684
100	2.158	6.24	4.08	2.05	277	0.671	368
100	2.157	8.47	8.12	3.77	689	0.555	877
100	2.156	6.34	4.55	2.28	313	0.640	419
100	2.156	6.71	5.34	2.69	389	0.599	519
100	2.157	8.16	7.36	3.42	602	0.581	764
100	2.155	9.05	8.77	4.02	784	0.556	986
100	2.147	6.36	4.89	2.33	318	0.634	427
100	2.141	7.83	6.38	3.19	535	0.593	680
111	2.140	5.88	3.75	1.88	238	0.680	320
111	2.157	5.98	4.07	2.01	260	0.664	351
111	2.163	6.00	-	2.00	259	0.667	348
111	2.153	6.04	4.34	2.09	272	0.654	368
111	2.158	8.66	8.29	3.74	699	0.568	877
111	2.164	6.25	4.58	2.27	308	0.637	419
111	2.161	6.77	5.42	2.68	392	0.604	519
111	2.157	8.11	7.49	3.43	600	0.577	764
111	2.162	9.00	8.72	4.01	787	0.558	968
UNKNOWN	2.165	5.86	-	1.76	223	0.700	298
UNKNOWN	2.151	9.00	9.62	4.15	803	0.539	1022
UNKNOWN	2.153	7.22	6.36	3.01	468	0.583	618
UNKNOWN	2.153	6.45	5.14	2.51	349	0.611	469
UNKNOWN	2.159	8.62	8.19	3.73	694	0.567	874
UNKNOWN	2.155	7.07	5.61	2.80	427	0.604	558

SODIUM CHLORIDE

AXIS	RHOO	US	UFS	UP	P	V/VO	PRESSURE IN
UNKNOWN	2.157	7.10	5.58	2.79	427	0.607	558

US = 3.608 + 1.334*UP KM/SEC (FOR 100 AXIS)
SIGMA US = 0.027 FROM UP = 1.10 TO 1.97 KM/SEC

US = 3.150 + 1.446*UP KM/SEC (FOR 100 AXIS)
SIGMA US = 0.098 FROM UP = 3.20 TO 4.07 KM/SEC

US = 3.635 + 1.184*UP KM/SEC (FOR 111 AXIS)
SIGMA US = 0.032 FROM UP = 2.00 TO 2.68 KM/SEC

US = 2.375 + 1.675*UP KM/SEC (FOR 111 AXIS)
SIGMA US = 0.026 FROM UP = 3.74 TO 4.01 KM/SEC

US = 3.174 + 1.357*UP KM/SEC (FOR 100, 111 AND UNKNOWN AXIS)
SIGMA US = 0.098 FROM UP = 2.25 TO 3.01 KM/SEC

US = 3.234 + 1.428*UP KM/SEC (FOR 100, 111 AND UNKNOWN AXIS)
SIGMA US = 0.101 FROM UP = 3.19 TO 4.15 KM/SEC

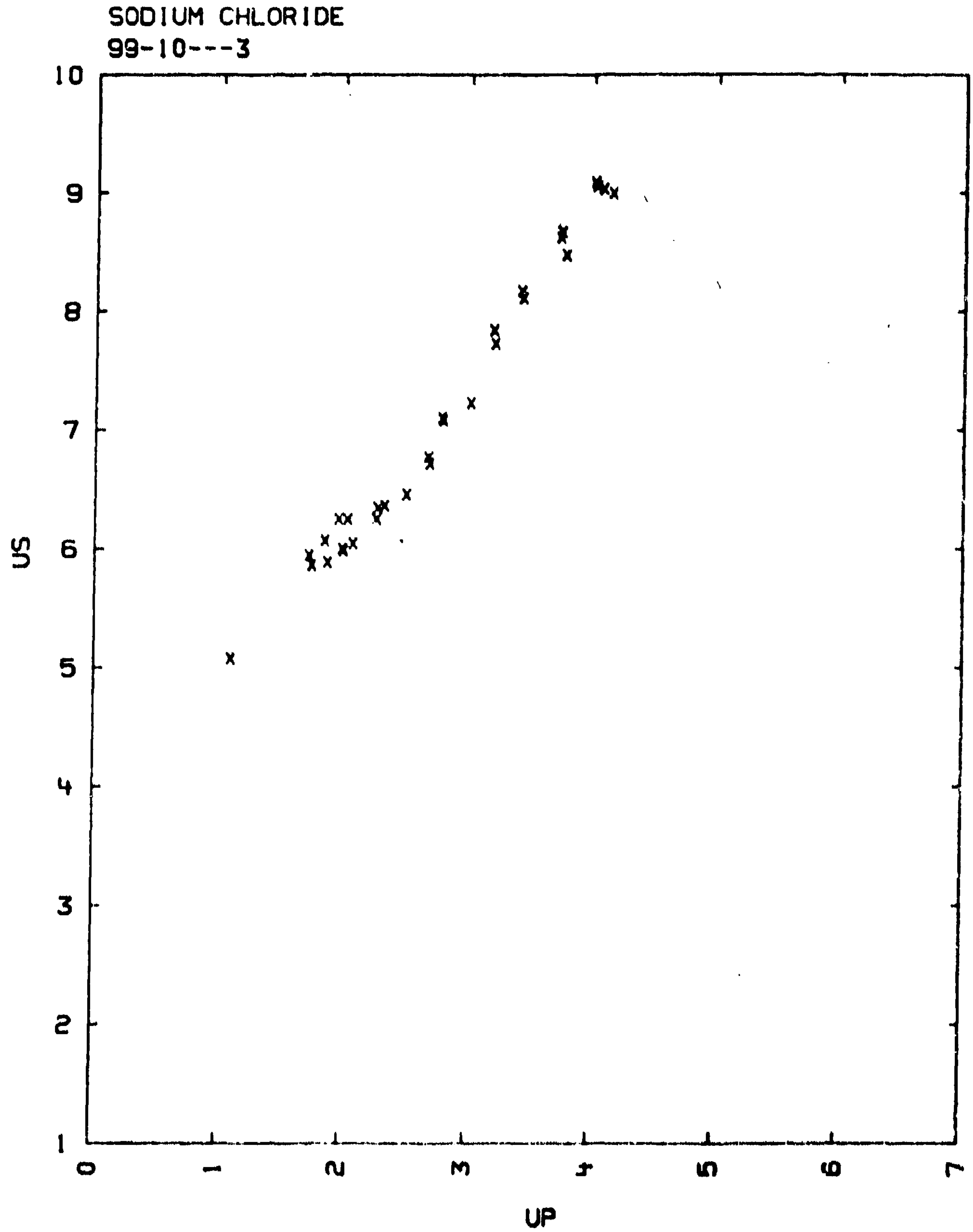
COMMENTS:

1) SOURCE: COMPILER
L. R. L. EQUATION OF STATE FILE
LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA
2) EXPERIMENTAL TECHNIQUE B (ALUMINUM STANDARD BASE PLATE)
DATA REDUCTION TECHNIQUE B.
3) PART OF THE TABULATED DATA ALSO REPORTED BY CHRISTIAN, R. H., IN EQUATION OF STATE OF ALKALI HALIDES AT HIGH PRESSURE (THESIS) UCRL-4900 MAY 16, 1957 UNIVERSITY OF CALIFORNIA, LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA.
4) A TRANSITION IS OBSERVED AROUND 220 KILOBARS FOR NA-CL WITH 111 AXIS OF ORIENTATION AND AROUND 270 KILOBARS FOR CRYSTALS WITH 100 AXIS OF ORIENTATION.
5) A STIFFENING OF THE HUGONIOT CAN BE OBSERVED BETWEEN 468 AND 535 KILOBARS.
6) ALSO LISTED IN REFERENCE OF COMMENT 3 ARE:

DEBYE TEMPERATURE	281 DEG. K
HEAT CAPACITY (CV)	0.83 J/G/DEG.
EXPANSION COEFFICIENT	0.000119 PER DEG.
COMPRESSIBILITY	4.[illegible] PER MEGABAR
MELTING POINT	808 DEG. C

7) THE VALUE OF VOI WAS OBTAINED FROM A LATTICE CONSTANT OF 5.64009 A A.C.A. MONOGRAPH NUMBER 5 (AMERICAN CRYSTALLOGRAPHIC ASSOCIATION, POLYCRYSTAL BOOK SERVICE 1963) 2ND EDITION.
8) SOUND VELOCITIES WERE MEASURED BY H.L. DUNEGAN (SUPPORT ENGINEERING, ULTRASONIC GROUP) LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIF.

TABLE I



99-10---4
SODIUM CHLORIDE

NA-CL PRESSED

VO = 0.466 CC/G   CL = 4.50-4.59 KM/SEC   CO = 3.54 KM/SEC
VOI = 0.4622 CC/G   CS = 2.47 KM/SEC

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN MM/MICROSEC, AND PRESSURE IN KILOBARS.

TABLE

RHOO	US	UFS	UP	P	V/VO	PRESSURE IN AL BASE PLATE
2.135	5.86	3.56	1.78	222	0.696	296
2.146	6.07	4.04	1.99	258	0.672	351
2.145	6.12	3.99	1.98	260	0.677	345
2.145	5.45	2.88	1.39	162	0.750	220
2.151	5.94	3.51	1.74	223	0.707	294
2.138	5.00	2.25	1.11	118	0.779	162
2.142	5.89	-	1.88	237	0.681	320
2.140	4.18	1.14	0.54	48	0.871	69
2.143	5.02	2.34	1.17	126	0.767	173
2.142	5.38	2.82	1.39	160	0.741	218
2.131	5.86	3.40	1.70	212	0.710	283
2.148	8.73	8.28	3.71	696	0.575	870
2.146	6.52	5.19	2.50	350	0.617	469
2.149	6.14	4.14	2.06	273	0.665	368
2.149	8.60	8.23	3.75	693	0.564	870
2.150	6.34	4.65	2.28	312	0.640	419
2.150	8.15	7.22	3.43	601	0.579	764
2.150	8.99	8.44	4.03	779	0.552	986
2.152	8.73	-	3.74	703	0.572	880
2.150	8.57	7.59	3.76	693	0.561	860
2.149	8.70	-	3.74	699	0.570	880
2.151	5.10	2.33	1.11	122	0.782	165
2.153	5.08	2.27	1.10	120	0.783	163
2.150	6.00	3.47	1.77	229	0.704	301
2.152	5.96	3.40	1.66	214	0.721	281
2.153	5.02	2.17	1.07	116	0.787	159
2.150	4.96	2.24	1.15	122	0.768	172
2.152	4.92	2.26	1.01	107	0.795	148

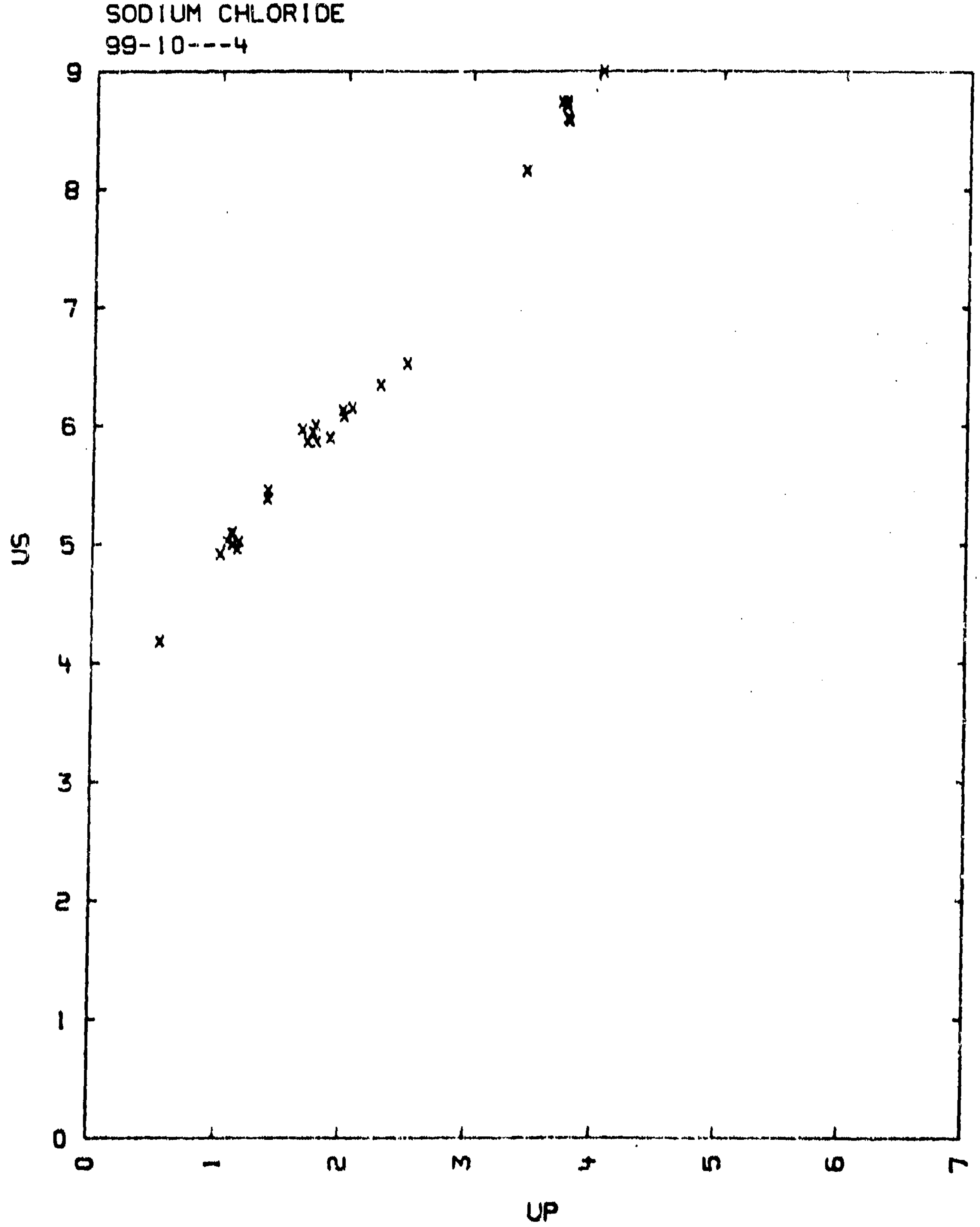
US = 3.426 + 1.439 UP MM/MICROSEC   FROM UP = 1.00 TO 1.80 MM/MICROSEC
SIGMA US = 0.079

US = 3.515 + 1.371 UP MM/MICROSEC   FROM UP = 3.70 TO 4.03 MM/MICROSEC
SIGMA US = 0.098

COMMENTS:

1) SOURCE: COMPILER
L. R. L. EQUATION OF STATE FILE
LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA
2) EXPERIMENTAL TECHNIQUE B (ALUMINUM STANDARD BASE PLATE)
DATA REDUCTION TECHNIQUE B.
3) THE HUGONIOT FOR PRESSED NA-CL IS CONSISTENT WITH THE SINGLE CRYSTAL HUGONIOT.
4) THE TRANSITION BETWEEN 220 AND 270 KILOBARS OBSERVED FOR SINGLE CRYSTAL NA-CL IS LESS PRONOUNCED FOR PRESSED NA-CL.
5) THE VALUE OF VO1 WAS OBTAINED FROM A LATTICE CONSTANT OF 5.64009 A A.C.A. MONOGRAPH NUMBER 5 (AMERICAN CRYSTALLOGRAPHIC ASSOCIATION. POLYCRYSTAL BOOK SERVICE 1963) 2ND EDITION.
6) SOUND VELOCITIES WERE MEASURED BY H.L. DUNEGAN (SUPPORT ENGINEERING, ULTRASONIC GROUP) LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIF.

TABLE I



99-10---5
SODIUM CHLORIDE

NA-CL

V0 = 0.4619 CC/G
V01 = 0.4622 CC/G

IN THE TABLES BELOW, DENSITY IS GIVEN IN G/CC., VELOCITIES IN KM/SEC., AND PRESSURE IN KILOBARS. ST DESIGNATES THE STANDARD MATERIAL AND UP(ST) IS THE PARTICLE VELOCITY OF THE STANDARD.

TABLE I
SINGLE CRYSTAL

RHO0	US	UP	P	V/V0	ST	UP(ST)
2.165	6.27	2.04	278	0.676	AL	1.72
-	10.39	5.19	1170	0.500	FE	3.60
-	10.75	5.55	1290	0.483	FE	3.85
-	11.61	5.95	1490	0.408	FE	4.16
-	12.14	6.92	1710	0.483	FE	4.56
-	11.84	6.80	1740	0.425	AL	6.03
-	12.96	7.83	2200	0.395	FE	5.44
-	16.84	11.05	4030	0.344	AL	9.95

US = 3.56 + 1.321 UP KM/SEC.   FOR US FROM 6.0 TO 12.0 KM/SEC.
SIGMA US = 0.14 KM/SEC.

US = 3.75 + 1.103 UP KM/SEC.   FOR US FROM 12.0 TO 16.8 KM/SEC.
SIGMA US = 0.07 KM/SEC.

V0 = 0.699-1.009 CC/G.

TABLE II
POROUS

RHO0	US	UP	P	V/V0	ST	UP(ST)
1.430	4.95	2.29	162	0.539	AL	1.60
-	7.27	3.81	397	0.475	FE	2.37
-	8.52	4.66	568	0.452	AL	3.54
-	9.06	4.97	645	0.451	FE	3.15
-	9.93	5.66	804	0.430	FE	3.60
-	10.19	6.00	874	0.413	AL	4.65
-	10.47	6.11	915	0.417	AL	4.76
0.991	4.45	2.53	112	0.431	AL	1.60
-	6.68	4.06	268	0.392	FE	2.37
-	8.33	5.12	424	0.385	AL	3.54
0.991	8.54	5.30	449	0.379	FE	3.15
-	9.54	6.02	570	0.369	FE	3.60
-	10.08	6.60	659	0.346	AL	4.65
-	10.49	6.70	695	0.362	AL	4.76

US = 0.605 + 1.938 UP - 0.0393 UP**2 KM/SEC.   FOR RHO0 = 1.430 G/CC.

SODIUM CHLORIDE

RHOO US UP P V/VO ST UP(ST)

FOR US BETWEEN 5.0 AND 10.5 KM/SEC. SIGMA US = 0.08 KM/SEC.

US = 0.191 + 1.768 UP - 0.0370 UP**2 KM/SEC. FOR RHOO = 0.991 G/CC.
FOR US BETWEEN 4.5 AND 10.5 KM/SEC. SIGMA = 0.12KM/SEC.

COMMENTS:

1) SOURCE: KORMER, S. B., SINITSYN, M. V., FUNTIKOV, A. I., URLIN, V. D. AND BLINOV, A. V.
SOVIET PHYS-JETP, VOL. 20, P. 811 (1965)
J. EXPTL. THEORET. PHYS. (U.S.S.R.) VOL. 47, P. 1202 (1964)
2) EXPERIMENTAL TECHNIQUE A
DATA REDUCTION TECHNIQUE B
3) VOI WAS OBTAINED FROM A CATION TO ANION DISTANCE OF 2.820 ANGSTROMS. SEE A.C.A. MONOGRAPH NUMBER 5 (AMERICAN CRYSTALLOGRAPHIC ASSOCIATION, POLYCRYSTAL BOOK SERVICE, BROOKLYN 1963) 2ND ED.
4) THE MEASURED EXPERIMENTAL ERROR IN THE SHOCK VELOCITY BELOW 10 KM/SEC IS 1 PERCENT OR LESS AND FOR THE HIGHER VALUES THE ERROR IS APPROXIMATELY 2 PER CENT. THE VALUE OF THE SHOCK VELOSITY WAS DETERMINED FROM 5-8 EXPERIMENTS.
5) ADDITIONAL CONSTANTS LISTED:
HEAT CAPACITY = 0.8535 JOULES/G/DEG.
BAND GAP = 7.7 EV.
6) THE ALUMINUM STANDARD HUGONIOT IS CHARACTERIZED BY THE FOLLOWING RELATIONSHIP: US = 5.254 + 1.458*UP - 0.0276*UP**2 + 0.00103*UP**3
SIGMA US = 0.013 KM/SEC. FOR UP = 0 TO 10.5 KM/SEC
RHOO = 2.71 G/CC.

TABLE I

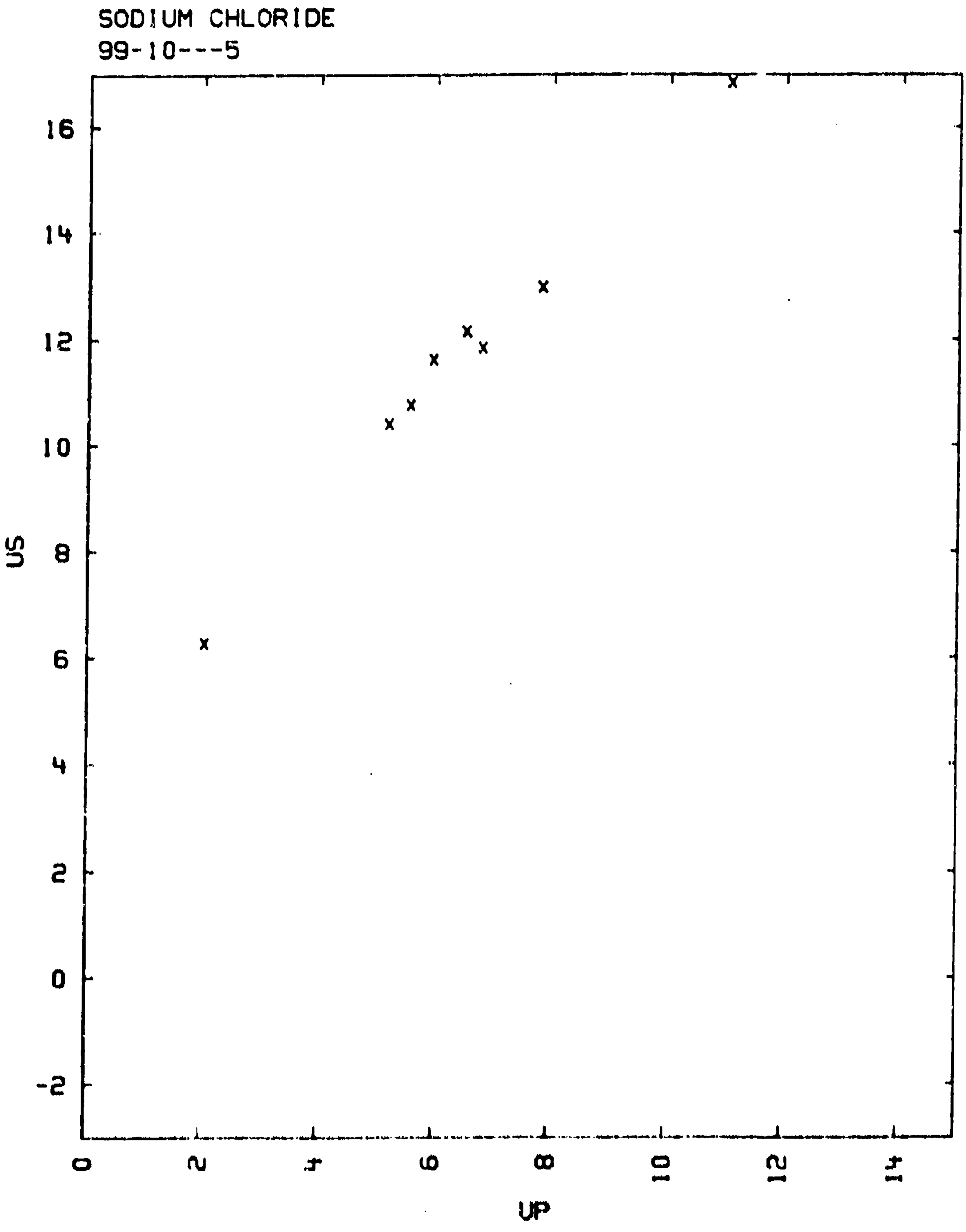
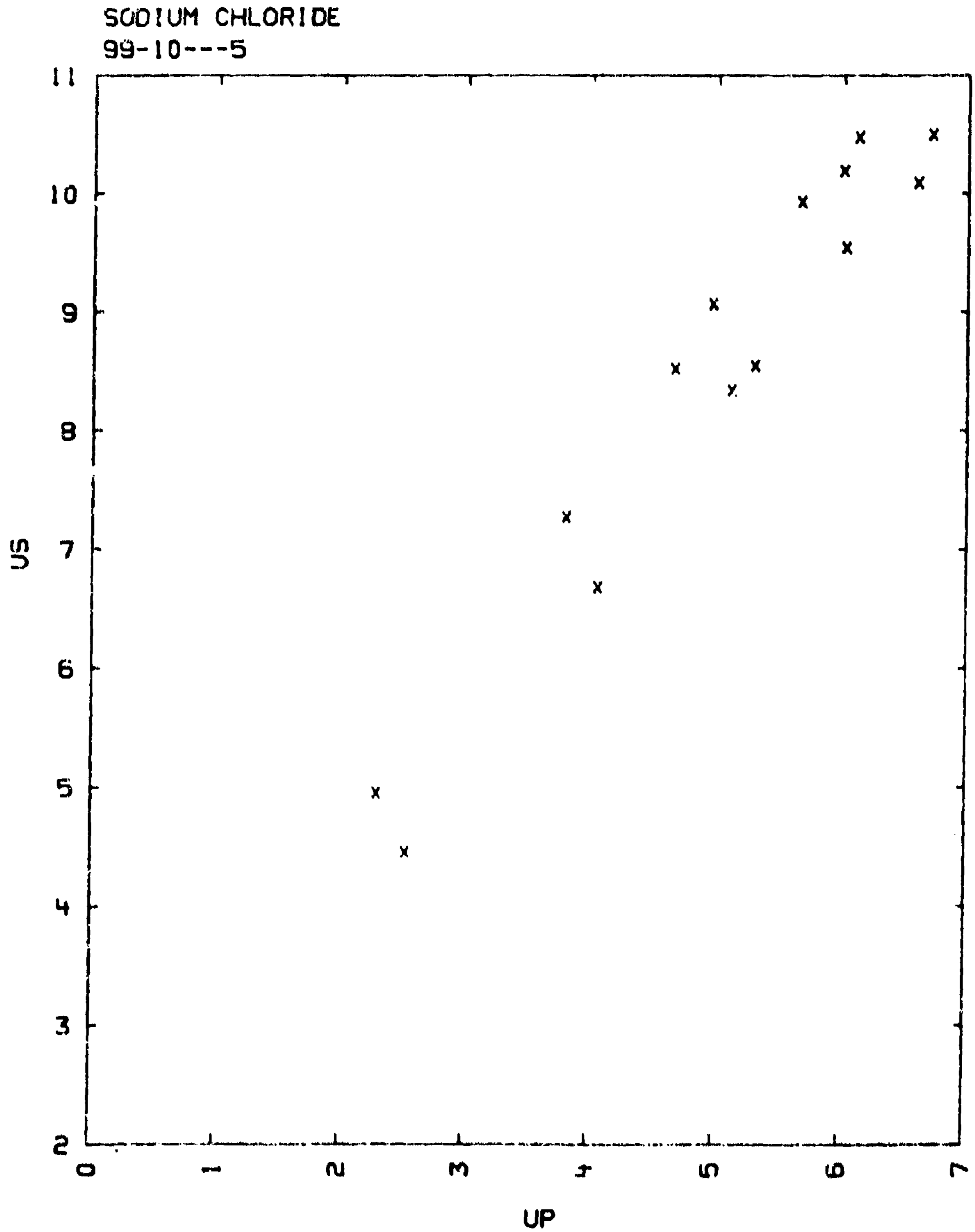


TABLE II



99-11---1
SODIUM BROMIDE

NA-BR PRESSED

VO = 0.316 CC/G
VOI = 0.3118 CC/G

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN MM/MICROSEC, AND PRESSURE IN KILOBARS.

TABLE

RHOO	US	UFS	UP	P	V/VO	PRESSURE IN AL BASE PLATE
3.165	3.38	1.13	0.55	58	0.838	75
3.177	3.34	1.08	0.54	57	0.839	73
3.16	4.00	2.07	1.06	133	0.736	165
3.160	4.29	2.61	1.30	177	0.697	215
3.165	4.38	2.73	1.36	189	0.689	230
3.162	4.79	3.30	1.63	247	0.659	293
3.145	5.10	-	1.83	293	0.641	345
3.158	5.06	3.80	1.85	295	0.635	345
3.17	5.10	3.69	1.89	305	0.630	356

US = 2.620 + 1.321 UP MM/MICROSEC
SIGMA US = 0.037

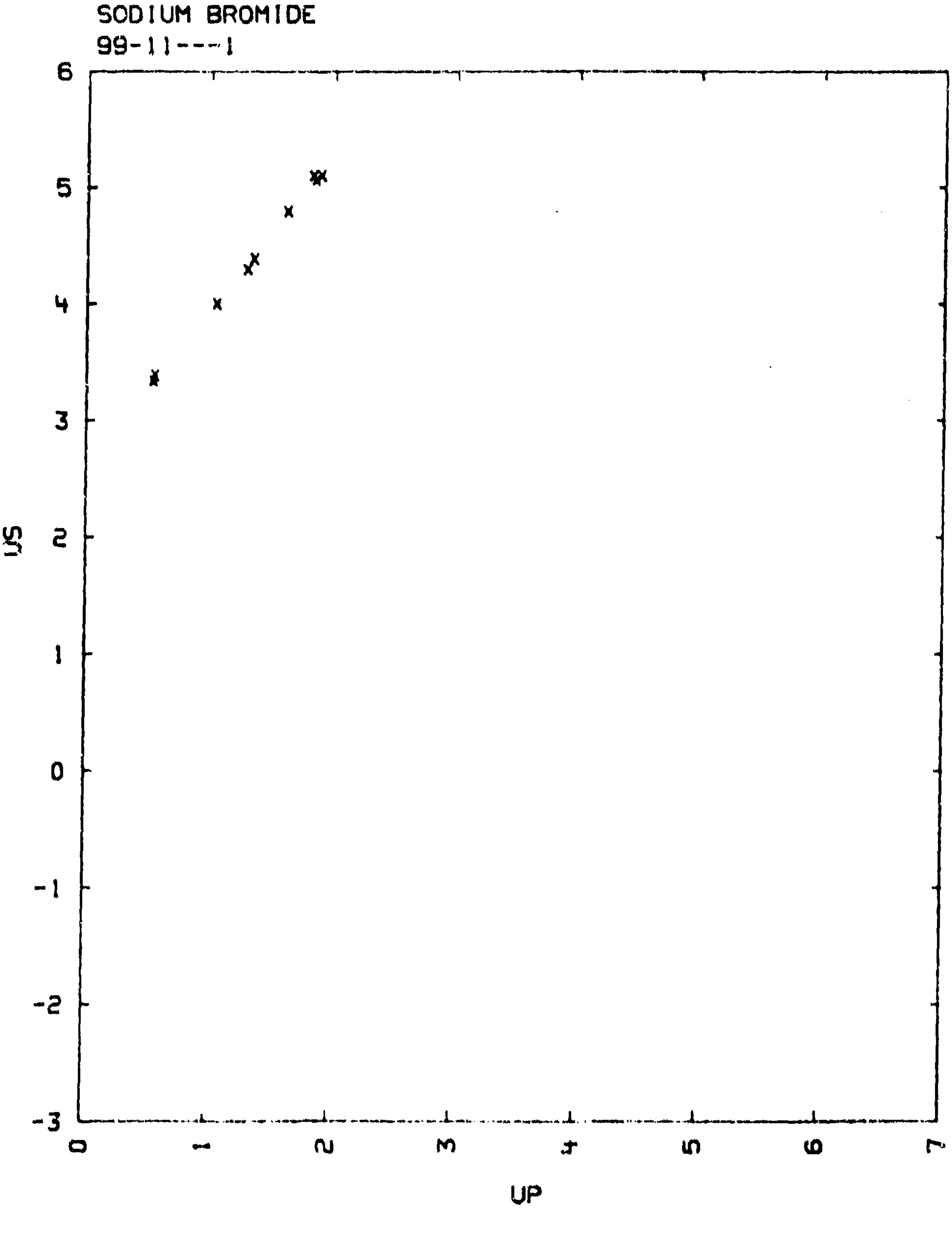
COMMENTS:

1) SOURCE: COMPILER
L. R. L. EQUATION OF STATE FILE
LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA
2) EXPERIMENTAL TECHNIQUE B (ALUMINUM STANDARD BASE PLATE)
DATA REDUCTION TECHNIQUE B.
3) TABULATED DATA ALSO REPORTED BY CHRISTIAN, R.H., IN
EQUATION OF STATE OF ALKALI HALIDES AT HIGH PRESSURE (THESIS)
UCRL-4900 MAY 16, 1957 UNIVERSITY OF CALIFORNIA,
LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA.
4) ALSO LISTED IN REFERENCE OF COMMENT 3 ARE:

DEBYE TEMPERATURE	200 DEG. K
HEAT CAPACITY (CV)	0.47 J/G/DEG.
EXPANSION COEFFICIENT	0.000120 PER DEG.
COMPRESSIBILITY	5.08 PER MEGABAR
MELTING POINT	750 DEG. C

5) THE VALUE OF VOI WAS OBTAINED FROM A LATTICE CONSTANT OF 5.97299 A
A.C.A. MONOGRAPH NUMBER 5 (AMERICAN CRYSTALLOGRAPHIC ASSOCIATION,
POLYCRYSTAL BOOK SERVICE 1963) 2ND EDITION.

TABLE I



99-12---1
SODIUM IODIDE

NA-1

V0 = 0.272 CC/G
V0I= 0.2727 CC/G   CB = 1.96 KM/SEC

IN THE TABLE BELOW DENSITY IS GIVEN IN G/CC, VELOCITY IN KM/SEC AND PRESSURE IN KILOBARS. SH DESIGNATES SAMPLE HOLDER.

TABLE

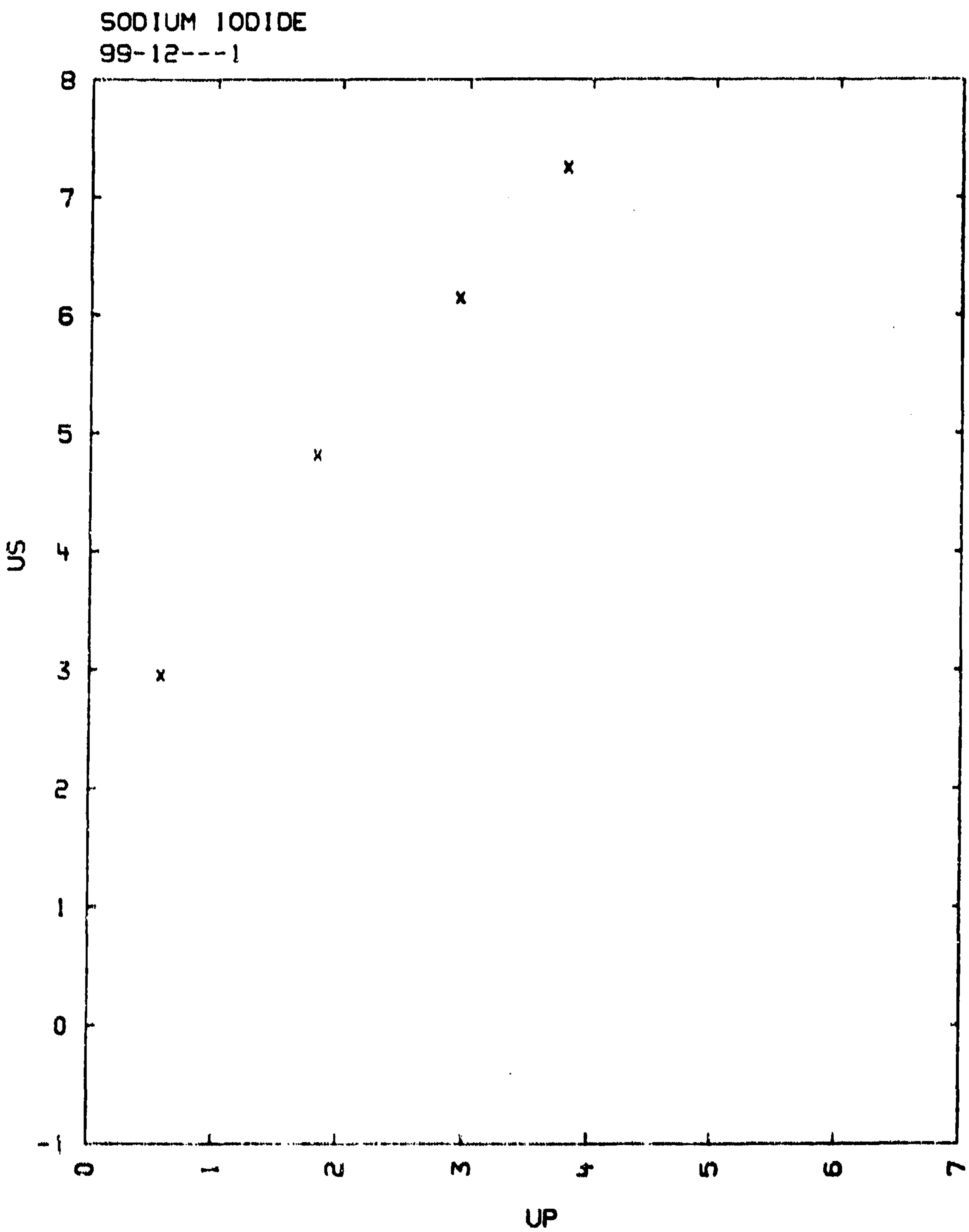
RHO0	US	UP	P	V/V0	SH	UP(SH)
3.67	2.95	0.57	62.0	0.8084	CU	0.37
-	4.81	1.82	321.0	0.6215	AL	1.71
-	6.14	2.94	661.0	0.5208	AL	2.82
-	7.24	3.80	1009.0	0.4750	FE	2.80

US = 2.09 + 1.576 UP - 0.0597 UP**2 KM/SEC
FOR UP FROM 0.5 TO 3.8 KM/SEC
SIG US = 0.063 KM/SEC

COMMENTS:

1) SOURCE: AL'TSHULER, L.V., PAVLOSKII, M.N., KULESHOVA, L.V., AND SIMAKOV, G.V.
SOVIET PHYS.-SOLID STATE, VOL. 5, P. 203 (1963)
2) EXPERIMENTAL TECHNIQUE A
DATA REDUCTION TECHNIQUE B.
3) THE SAMPLES WERE POSITIONED ON PLATES OF CU AL AND FE AS INDICATED IN TABLE COLUMN 6.
THE HUGONIOTS OF FE CU AND AL WERE OBTAINED FROM
AL'TSHULER, L.V., KORMER, S.B., BAKANOVA, A.A. AND TRUNIN, R.F.
JETP VOL 11, P.573 (1960)
4) THE AL AND CU ADIABAT WERE OBTAINED BY REFLECTING THE HUGONIOT IN THE P VS UP PLANE. CORRECTIONS WERE MADE FOR FE.
5) OTHER CONSTANTS LISTED ARE: DEBYE TEMPERATURE 140 DEG. K
HEAT CAPACITY (CV) 0.325 J/G/DEG.
CATION TO ANION DISTANCE 3.231 KX
EXPANSION COEFFICIENT 0.000135 PER DEG
6) THE VALUE OF V0I WAS OBTAINED FROM A CATION TO ANION DISTANCE OF 3.2375 A. A.C.A. MONOGRAPH NUMBER 5 (AMERICAN CRYSTALLOGRAPHIC ASSN., POLYCRYSTAL BOOK SERVICE, BROOKLYN 1963) 2ND ED.

TABLE I



99-12---2
SODIUM IODIDE

NA-1 SINGLE CRYSTAL

VO = 0.275 CC/G
VOI = 0.2727 CC/G

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN MM/MICROSEC, AND PRESSURE IN KILOBARS.

TABLE

RHOO	US	UFS	UP	P	V/VO	PRESSURE IN AL BASE PLATE
3.638	3.58	2.12	1.02	134	0.714	182
3.640	4.03	2.70	1.35	200	0.665	235
3.630	4.39	3.35	1.61	259	0.634	297
3.623	4.58	-	1.86	310	0.593	358

US = 2.370 + 1.216 UP MM/MICROSEC
SIGMA US = 0.062

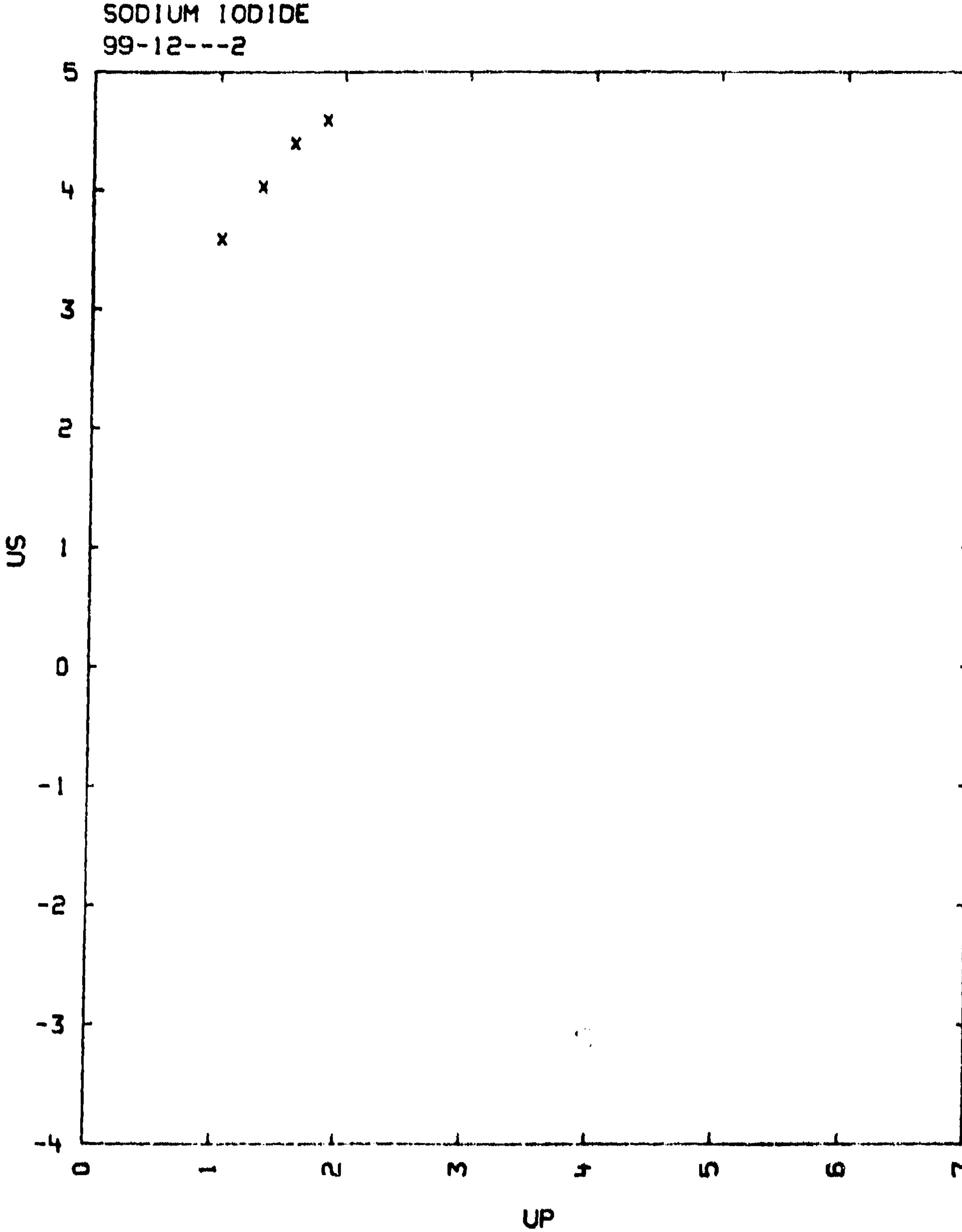
COMMENTS:

1) SOURCE: COMPILER
L. R. L. EQUATION OF STATE FILE
LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA
2) EXPERIMENTAL TECHNIQUE B (ALUMINUM STANDARD BASE PLATE)
DATA REDUCTION TECHNIQUE B.
3) TABULATED DATA ALSO REPORTED BY CHRISTIAN, R.H., IN EQUATION OF STATE OF ALKALI HALIDES AT HIGH PRESSURE (THESIS) UCRL-4900 MAY 16, 1957 UNIVERSITY OF CALIFORNIA, LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA.
4) ALSO LISTED IN REFERENCE OF COMMENT 3 ARE:

DEBYE TEMPERATURE	151 DEG. K
HEAT CAPACITY (CV)	0.33 J/G/DEG.
EXPANSION COEFFICIENT	0.000135 PER DEG.
COMPRESSIBILITY	7.07 PER MEGABAR
MELTING POINT	662 DEG. C

5) THE VALUE OF VOI WAS OBTAINED FROM A LATTICE CONSTANT OF 6.475 A A.C.A. MONOGRAPH NUMBER 5 (AMERICAN CRYSTALLOGRAPHIC ASSOCIATION, POLYCRYSTAL BOOK SERVICE 1963) 2ND EDITION.

TABLE I



99-29-24-1---1
JADEITE, BURMA (SODIUM ALUMINUM SILICATE) (SILICATE ROCK)

NA-AL-SI2-O6 ABOUT 100 VOLUME PERCENT

V0 = 0.300 CC/G CL = 8.66 KM/SEC C0 = 6.42 KM/SEC
V01= 0.299 CC/G

THE TABLE LISTS SHOCK AND PARTICLE VELOCITY IN KM/SEC., PRESSURE IN KBARS AND DENSITY IN G/CC. ST DESIGNATES THE SAMPLE HOLDER AND STANDARD MATERIAL.

TABLE

RHO0	US	UP	P	V/V0	US(ST)
3.33	7.84	1.03	269	0.869	6.95
3.33	7.78	1.05	271	0.865	6.97
3.33	7.86	1.19	313	0.847	7.18
3.33	8.22	1.46	401	0.822	7.58
3.33	8.25	1.48	406	0.820	7.60
3.33	8.20	1.51	413	0.814	7.64
3.33	8.80	1.91	560	0.782	8.23
3.33	8.78	1.99	583	0.773	8.33
3.33	9.07	2.31	698	0.745	8.77
3.33	9.05	2.32	701	0.742	8.78
3.34	9.33	2.81	874	0.700	9.42
3.33	9.39	3.02	944	0.678	9.68
3.33	9.42	3.05	959	0.675	9.73
3.35	9.72	3.34	1086	0.657	10.13
3.34	9.83	3.50	1147	0.645	10.33

US = 6.54 + 1.124*UP KM/SEC. FOR UP LESS THAN 2.4 KM/SEC
SIGMA US = 0.088 KM/SEC.
US = 6.56 + 0.939*UP FOR UP GREATER THAN 3.0 KM/SEC
SIGMA US = 0.021 KM/SEC

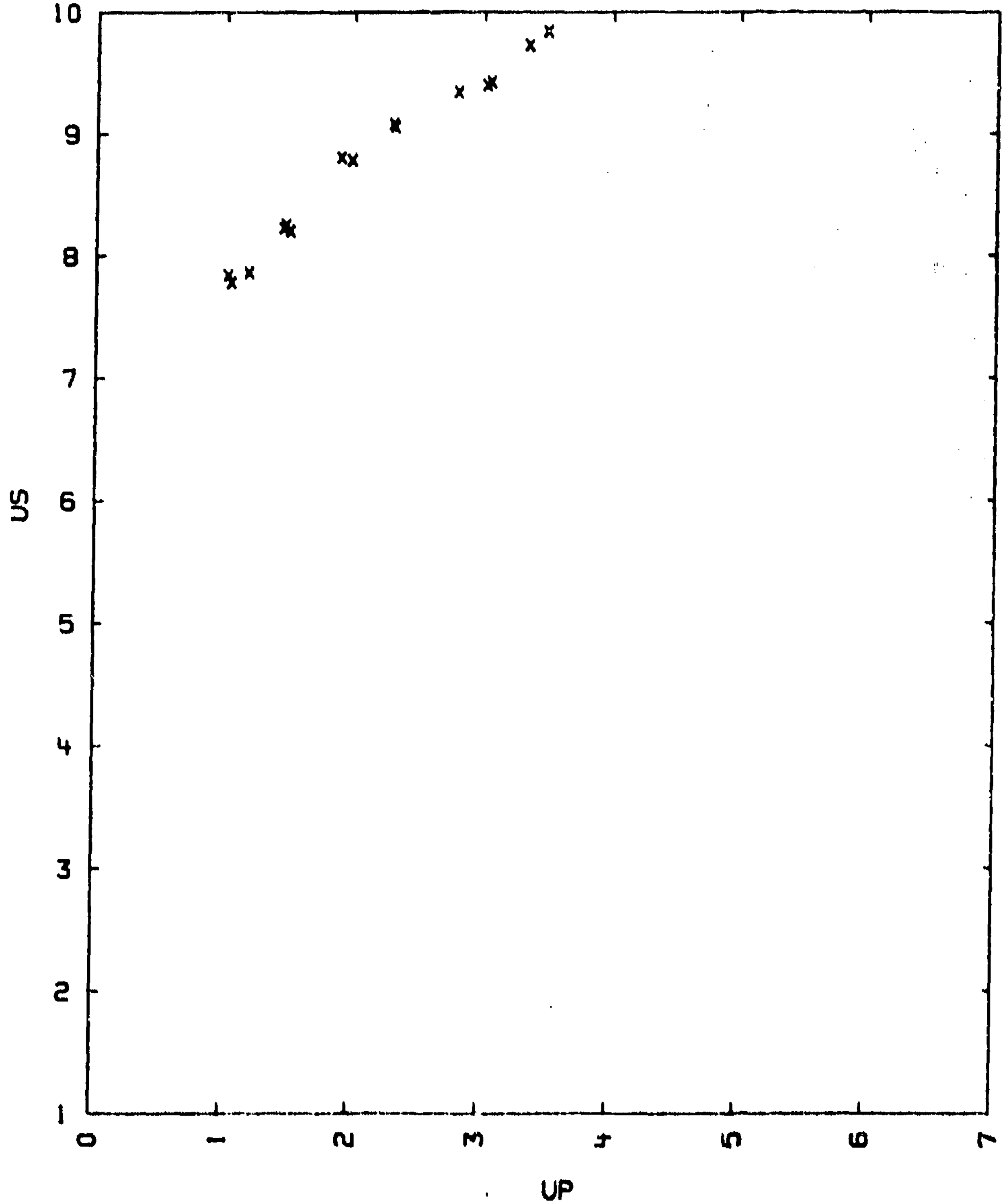
COMMENTS :

1) SOURCE: MCQUEEN R.G. AND MARSH S.P.
PRIVATE COMMUNICATION
LOS ALAMOS SCIENTIFIC LABORATORY, LOS ALAMOS, NEW MEXICO, USA
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION METHOD B STANDARD MATERIAL 2024 ALUMINUM
3) V01 WAS OBTAINED FROM THE LATTICE PARAMETERS LISTED IN CRYSTAL DATA DETERMINATIVE TABLES (AMERICAN CRYST. ASSN., 1963)
4) SAMPLE OBTAINED THROUGH F. BIRCH. CL FROM F. BIRCH, J. GEOPHYS. RES., VOL 65, P. 1083 (1960)
5) FURTHER WORK IN PROGRESS

TABLE I

JADEITE, BURMA (SODIUM ALUMINUM SILICATE) (SILICA

99-29-24-1---1



100-9---1
POTASSIUM FLUORIDE

K-F PRESSED

VO = 0.401 CC/G
VOI = 0.3955 CC/G

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN MM/MICROSEC, AND PRESSURE IN KILOBARS.

TABLE

RHOO	US	UFS	UP	P	V/VO	PRESSURE IN AL BASE PLATE
2.485	4.23	-	1.11	117	0.738	162
2.484	4.69	2.84	1.43	168	0.695	225
2.492	5.24	3.55	1.78	232	0.661	304
2.474	6.77	5.40	2.69	450	0.602	553
2.50	4.70	2.78	1.44	169	0.694	228
2.536	4.20	2.27	1.17	124	0.721	171
2.469	3.91	1.88	0.97	94	0.752	136

US = 2.324 + 1.650 UP MM/MICROSEC
SIGMA US = 0.043

COMMENTS:

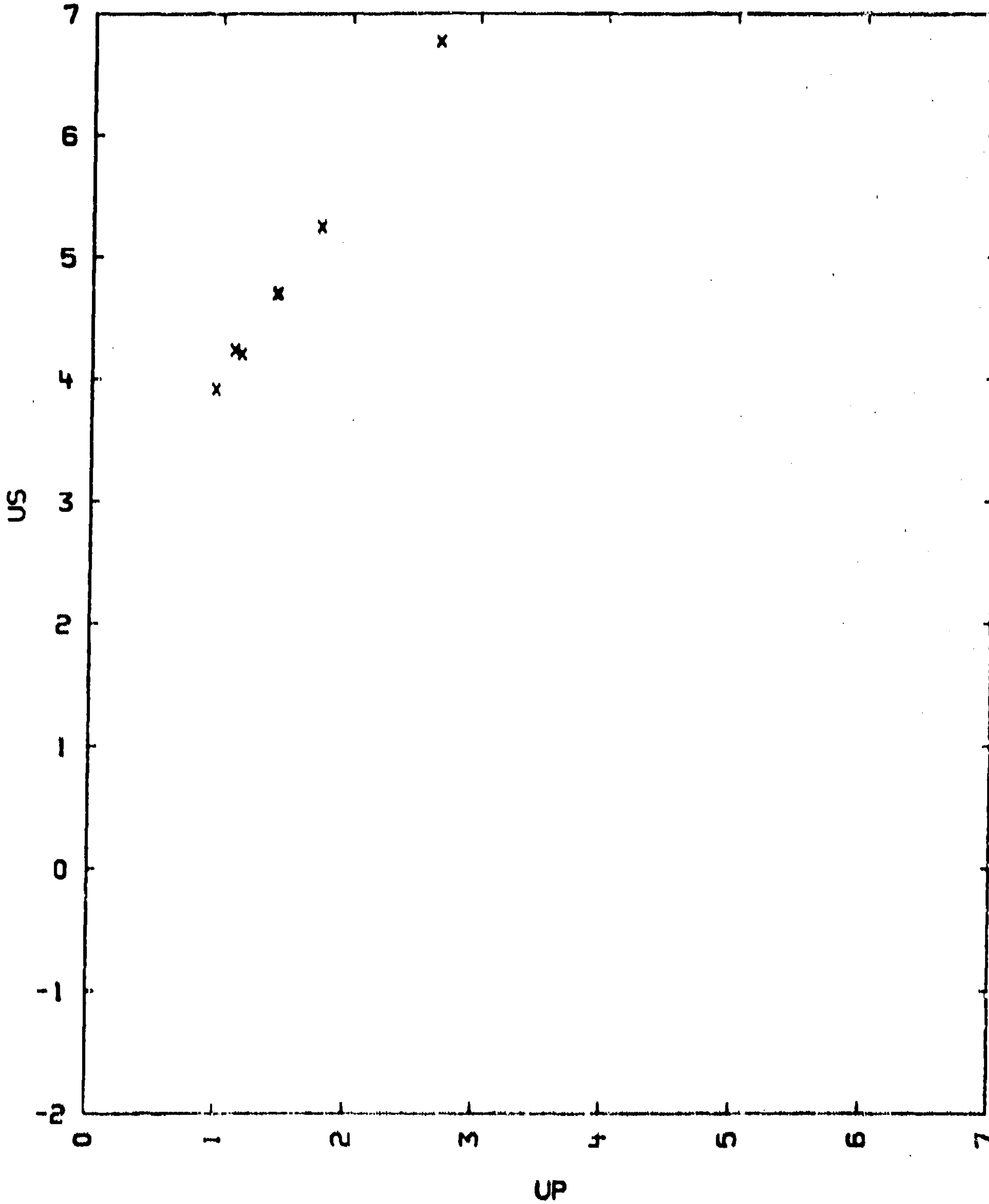
1) SOURCE: COMPILER
L. R. L. EQUATION OF STATE FILE
LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA
2) EXPERIMENTAL TECHNIQUE B (ALUMINUM STANDARD BASE PLATE)
DATA REDUCTION TECHNIQUE B.
3) PART OF THE TABULATED DATA ALSO REPORTED BY CHRISTIAN, R. H., IN EQUATION OF STATE OF ALKALI HALIDES AT HIGH PRESSURE (THESIS) UCRL-4900 MAY 16, 1957 UNIVERSITY OF CALIFORNIA, LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA.
4) ALSO LISTED IN REFERENCE OF COMMENT 3 ARE:

DEBYE TEMPERATURE	321 DEG. K
HEAT CAPACITY (CV)	0.81 J/G/DEG.
EXPANSION COEFFICIEN	0.000100 PER DEG.
COMPRESSIBILITY	3.31 PER MEGABAR
MELTING POINT	856 DEG. C

5) THE VALUE OF VOI WAS OBTAINED FROM A LATTICE CONSTANT OF 5.344 A A.C.A. MONOGRAPH NUMBER 5 (AMERICAN CRYSTALLOGRAPHIC ASSOCIATION, POLYCRYSTAL BOOK SERVICE 1963) 2ND EDITION.

TABLE I

POTASSIUM FLUORIDE
100-9---1



100-10---1
POTASSIUM CHLORIDE

K-CL

V0 = 0.502 CC/G
V01= 0.5033 CC/G CB = 3.02 KM/SEC

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN KM/SEC AND PRESSURE IN KILOBARS. SH DESIGNATES SAMPLE HOLDER.

TABLE

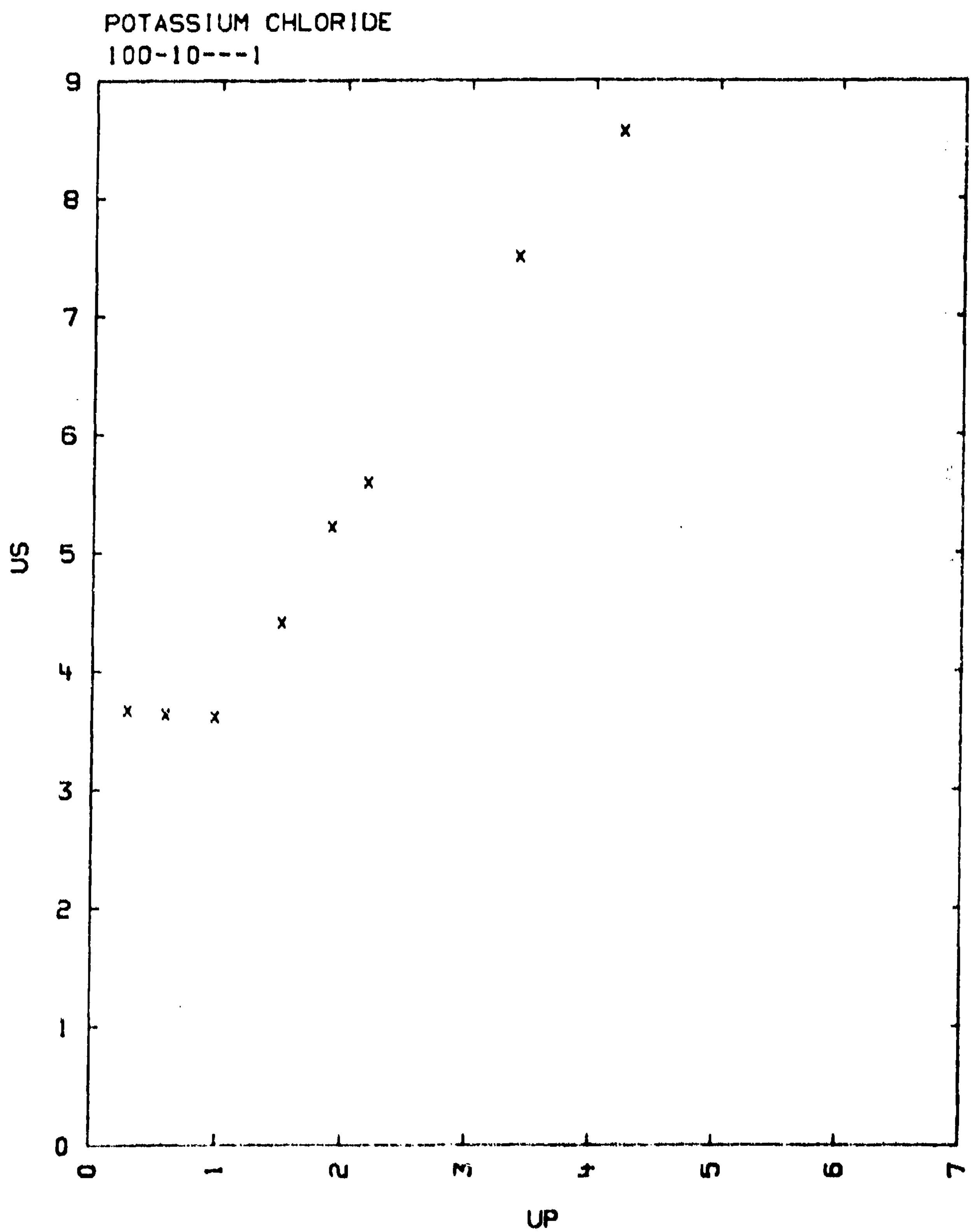
RHOO	US	UP	P	V/V0	SH	UP(SH)
1.99	3.67	0.28	20.0	0.9242	CU	0.17
-	3.63	0.58	41.8	0.8403	CU	0.35
-	3.61	0.98	70.5	0.7289	AL	0.69
-	4.40	1.51	132.0	0.6570	AL	1.14
-	5.21	1.91	198.0	0.6341	AL	1.50
-	5.59	2.20	244.5	0.6064	AL	1.74
-	7.50	3.40	508.0	0.5464	AL	2.82
-	8.56	4.22	716.0	0.5076	FE	2.80

US = 2.15 + 1.54 UP KM/SEC FOR UP BETWEEN 1.0 AND 4.2 KM/SEC
SIG US = 0.1

COMMENTS:

1) SOURCE: AL'TSHULER, L.V., PAVLOVSKII, M.M., KULESHOVA, L.V.,
AND SIMAKOV, G.V.
SOVIET PHYS.-SOLID STATE, VOL. 5, P. 203 (1963)
2) EXPERIMENTAL TECHNIQUE A
DATA REDUCTION TECHNIQUE B.
3) THE SAMPLES WERE POSITIONED ON PLATES OF CU AL AND FE AS INDICATED IN TABLE COLUMN G.
THE HUGONIOTS OF FE CU AND AL WERE OBTAINED FROM
AL'TSHULER, L.V., KORMER, S.B., BAKANOVA, A.A. AND TRUNIN, R.F.
JETP VOL 11, P.573 (1960)
4) THE AL AND CU ADIABAT WERE OBTAINED BY REFLECTING THE HUGONIOT IN THE P VS UP PLANE. CORRECTIONS WERE MADE FOR FE.
5) OTHER CONSTANTS LISTED ARE: DEBYE TEMPERATURE 227 DEG. K
HEAT CAPACITY (CV) 0.662 J/G/DEG.
CATION TO ANION DISTANCE 3.14 KX
EXPANSION COEFFICIENT 0.000100 PER DEG
6) POINTS WITH UP = 0.98 OR LESS CORRESPOND TO A MULTIPLE SHOCK WAVE OF WHICH ONLY THE FIRST WAVE WAS OBSERVED.
7) THE VALUE OF V01 LISTED WAS OBTAINED FROM A CATION TO ANION DISTANCE OF 3.1464 A. A.C.A. MONOGRAPH NUMBER 5 (AMERICAN CRYSTALLOGRAPHIC ASSN., POLYCRYSTAL BOOK SERVICE, BROOKLYN 1963) 2ND ED.

TABLE I



100-10---2
POTASSIUM CHLORIDE

K-CL

VO (SINGLE CRYSTAL) = 0.504 CC/G
VOI = 0.5026 CC/G

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN MM/MICROSEC, AND PRESSURE IN KILOBARS.

TABLE

SAMPLE							STANDARD
RHOO	US	UFS	UP	P	V/VO	FORM	P
1.982	4.04	2.36	1.21	97	0.700	CRYSTAL	162
1.984	5.19	3.74	1.88	194	0.636	-	296
1.985	5.54	4.07	2.08	223	0.624	-	344
1.970	4.64	3.08	1.57	144	0.661	PRESSED	230
1.970	5.51	4.24	2.13	232	0.613	-	351
1.953	8.64	9.24	4.34	733	0.498		1022

US = 2.406 + 1.448 UP MM/MICROSEC
SIGMA US = 0.096

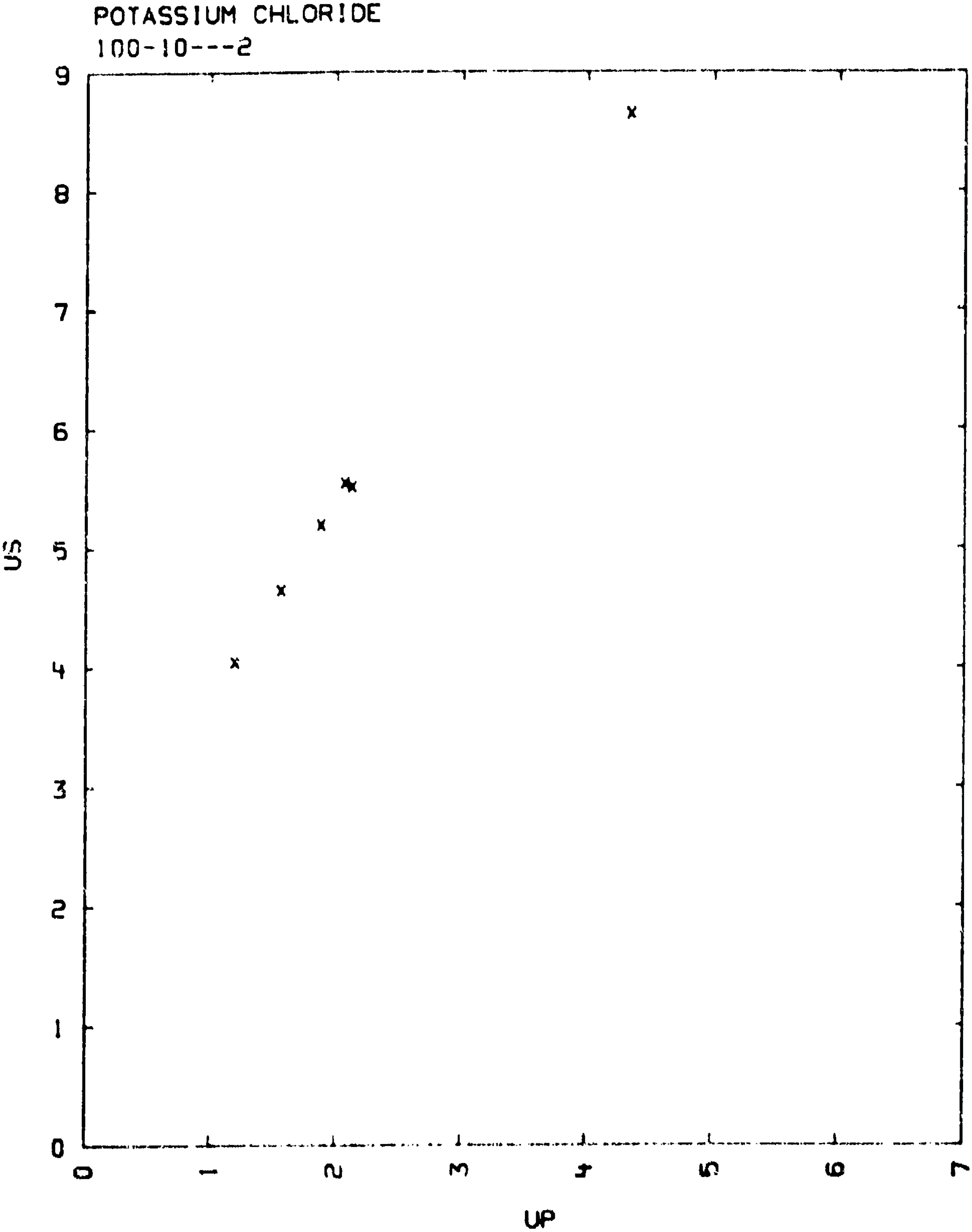
COMMENTS:

1) SOURCE: COMPILER
L. R. L. EQUATION OF STATE FILE
LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA
2) EXPERIMENTAL TECHNIQUE B (ALUMINUM STANDARD BASE PLATE)
DATA REDUCTION TECHNIQUE B.
3) PART OF THE TABULATED DATA ALSO REPORTED BY CHRISTIAN, R. H., IN EQUATION OF STATE OF ALKALI HALIDES AT HIGH PRESSURE (THESIS) UCRL-4900 MAY 16, 1957 UNIVERSITY OF CALIFORNIA, LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA.
4) ALSO LISTED IN REFERENCE OF COMMENT 3 ARE:

DEBYE TEMPERATURE	227 DEG. K
HEAT CAPACITY (CV)	0.65 J/G/DEG.
EXPANSION COEFFICIENT	0.000103 PER DEG.
COMPRESSIBILITY	5.63 PER MEGABAR
MELTING POINT	772 DEG. C

5) THE VALUE OF VOI WAS OBTAINED FROM A LATTICE CONSTANT OF 6.29 A
A.C.A. MONOGRAPH NUMBER 5 (AMERICAN CRYSTALLOGRAPHIC ASSOCIATION, POLYCRYSTAL BOOK SERVICE 1963) 2ND EDITION.

TABLE I



100-10---3
POTASSIUM CHLORIDE

K-CL

V0 = 0.5020 CC/G
V01 = 0.5033 CC/G

IN THE TABLES BELOW, DENSITY IS GIVEN IN G/CC., VELOCITIES IN KM/SEC., AND PRESSURE IN KILOBARS. ST DESIGNATES THE STANDARD MATERIAL AND UP(ST) IS THE PARTICLE VELOCITY OF THE STANDARD.

TABLE I
SINGLE CRYSTAL

RHO0	US	UP	P	V/V0	ST	UP(ST)
1.992	5.62	2.17	240	0.613	AL	1.72
-	9.76	5.35	1040	0.452	FE	3.60
-	9.96	5.74	1140	0.424	FE	3.85
-	10.67	6.16	1310	0.422	FE	4.16
-	10.93	6.10	1330	0.442	FE	4.13
-	11.43	6.71	1530	0.413	FE	4.56
-	11.29	7.10	1600	0.372	AL	6.03
-	12.63	8.02	2020	0.366	FE	5.44
-	16.69	11.38	3790	0.318	AL	9.95

US = 3.60 + 1.142 UP KM/SEC. FOR US FROM 9.7 TO 16.7 KM/SEC.
SIGMA US = 0.25 KM/SEC.

V0 = 0.709-1.259 CC/G

TABLE II
POROUS

RHO0	US	UP	P	V/V0	ST	UP(ST)
1.41	4.89	2.30	158	0.529	AL	1.60
-	10.34	6.56	958	0.365	FE	4.13
0.794	4.23	2.66	89	0.372	AL	1.60
-	9.95	7.19	566	0.277	FE	4.13

US =

COMMENTS:

1) SOURCE: KORMER, S. B., SINITSYN, M. V., FUNTIKOV, A. I., URLIN, V. D. AND BLINOV, A. V.
SOVIET PHYS-JETP, VOL. 20, P. 811 (1965)
J. EXPTL. THEORET. PHYS. (U.S.S.R.) VOL. 47, P. 1202 (1964)
2) EXPERIMENTAL TECHNIQUE A
DATA REDUCTION TECHNIQUE B
3) V01 HAS OBTAINED FROM A CATION TO ANION DISTANCE OF 3.1464 ANGSTROMS
A.C.A. MONOGRAPH NUMBER 5 (AMERICAN CRYSTALLOGRAPHIC ASSOCIATION, POLYCRYSTAL BOOK SERVICE, BROOKLYN, N.Y., 1963) 2ND ED.

4) THE MEASURED EXPERIMENTAL ERROR IN THE SHOCK VELOCITY BELOW 10 KM/SEC IS 1 PERCENT OR LESS AND FOR THE HIGHER VALUES THE ERROR IS BETWEEN 1.5 AND 2 PERCENT. THE VALUE OF THE SHOCK VELOCITY HAS DETERMINED FROM 5-8 EXPERIMENTS.

5) ADDITIONAL CONSTANTS LISTED:

HEAT CAPACITY = 0.6693 JOULES/G/DEG.
BAND GAP = 7.5 EV.

6) THE ALUMINUM STANDARD HUGONIOT IS CHARACTERIZED BY THE FOLLOWING RELATIONSHIP: US = 5.254 + 1.458*UP - 0.0276*UP**2 + 0.00103*UP**3
SIGMA US = 0.013 KM/SEC. FOR UP = 0 TO 10.5 KM/SEC
RHOO = 2.71 G/CC.

TABLE I

POTASSIUM CHLORIDE
100-10---3

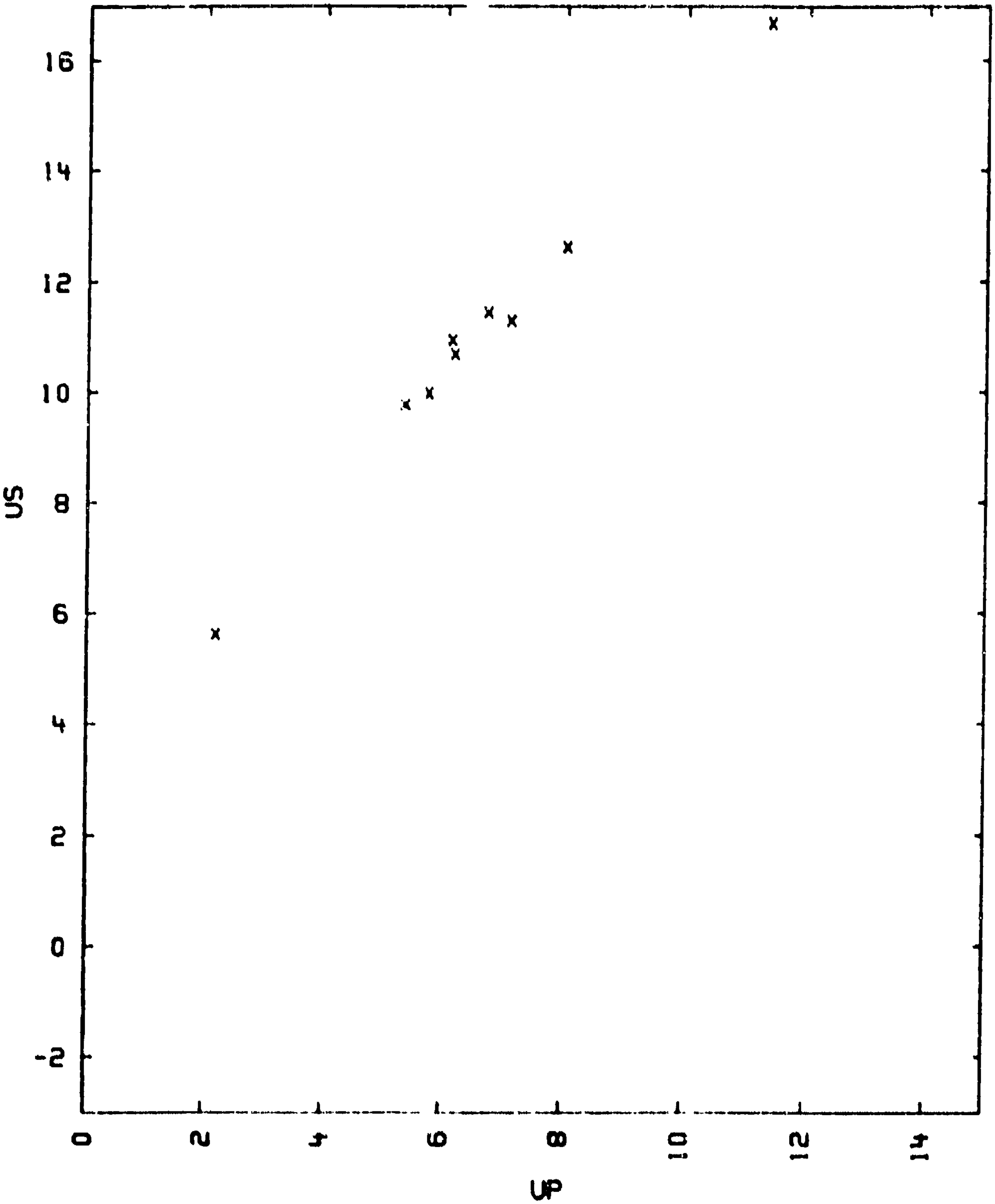
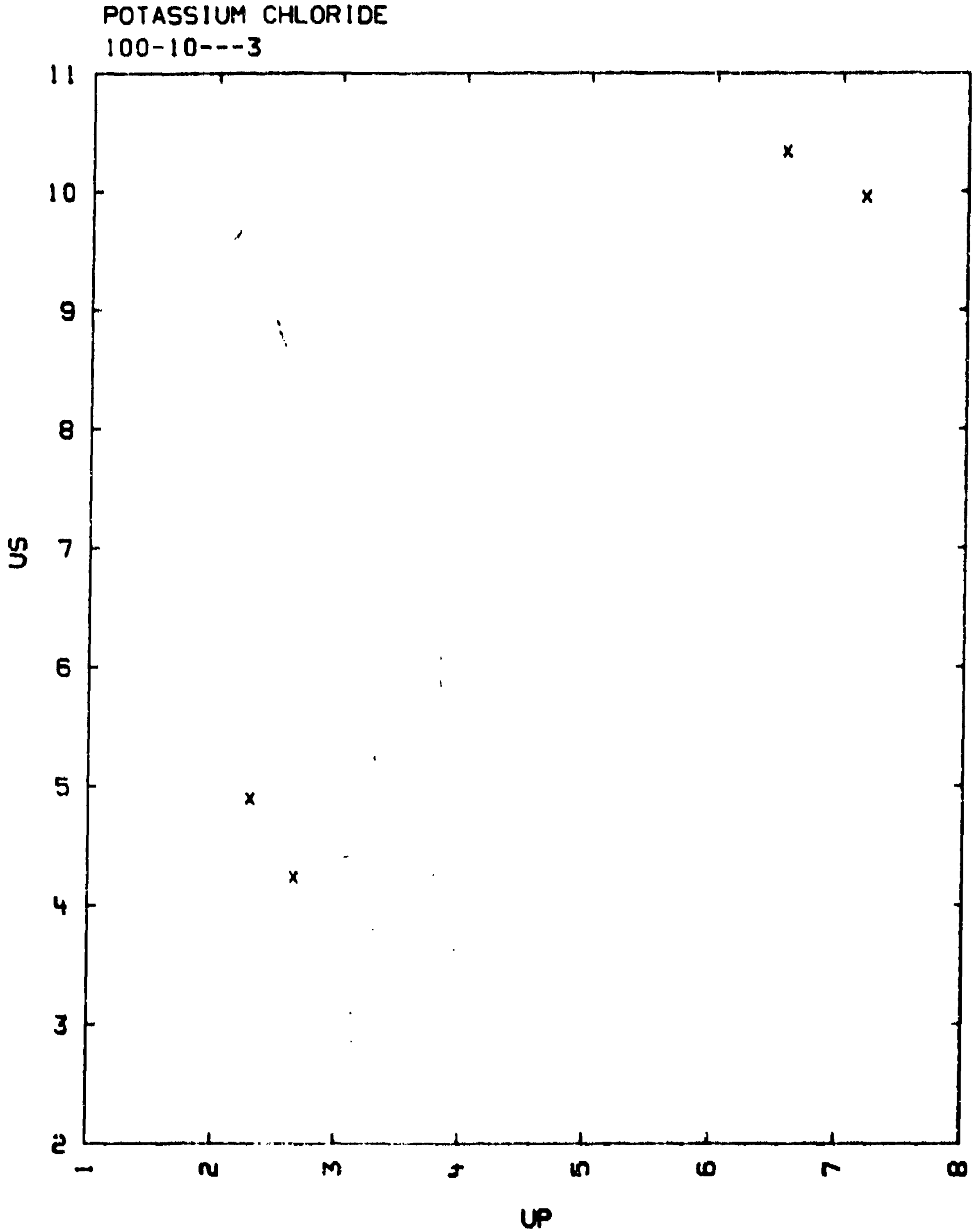


TABLE II



100-10---4
POTASSIUM CHLORIDE

K-CL

CO = 3.04 KM/SEC

VOI= 0.5033 CC/G

THE TABLE LISTS IDEAL DENSITY IN G/CC, PARTICLE VELOCITY AND DERIVED SHOCK SPEED IN KM/SEC, INSTANTANEOUS PRESSURE AND PRESSURE ATTENUATION IN KBAR AND TIME REQUIRED FOR ATTENUATION IN NANOSECONDS. CRYSTALS WERE SLICE ON (100) AND (111) PLANES. U IS VELOCITY OF SAMPLE PRIOR TO IMPACT DUP AND DP ARE THE OBSERVED CHANGES. THE IMPACTED STANDARD IS QUARTZ

TABLE

PLANE	RHOO	US	UP	DUP	P	DP	V/VO	U	TAU
111	1.987	3.48	0.249	0.000	17.2	0.0	0.9284	0.363	
-	-	3.52	0.276	0.000	19.3	0.0	0.9216	0.404	
-	-	3.41	0.332	0.006	22.5	0.9	0.9026	0.480	43.
-	-	3.10	0.419	0.012	25.8	1.8	0.8648	0.590	21.
-	-	3.12	0.395	0.011	24.5	1.6	0.8735	0.557	27.
-	-	3.32	0.361	0.011	23.8	1.7	0.9812	0.518	39.
-	-	3.22	0.384	0.008	24.6	1.0	0.8809	0.546	28.
100	-	3.10	0.425		26.2		0.8630	0.598	
-	-	3.23	0.380		24.4		0.8824	0.541	
-	-	3.39	0.337		22.7		0.9006	0.487	
-	-	3.59	0.287		20.5		0.9202	0.422	
-	-	3.45	0.252		17.3		0.9271	0.366	
-	-	3.10	0.422		26.0		0.8639	0.593	
-	-	2.84	0.550		31.1		0.8067	0.755	
-	-	3.58	0.298		21.2		0.9167	0.438	
-	-	3.53	0.304		21.3		0.9138	0.445	
-	-	3.52	0.276		19.3		0.9216	0.403	
-	-	3.05	0.428		26.0		0.8600	0.600	
-	-	3.14	0.385		24.0		0.8773	0.544	
-	-	3.55	0.309		21.8		0.9130	0.453	
-	-	3.11	0.437		27.0		0.8595	0.615	

US = 3.07 + 1.63*UP KM/SEC FOR UP<0.31 KM/SEC
SIG US = 0.032 KM/SEC
US = 4.22 - 2.62*UP KM/SEC FOR 0.33<UP<0.55 KM/SEC
SIG US = 0.048 KM/SEC
NOTE US = P INTERFACE/(RHOO*UP) NOT EXPERIMENTAL

COMMENTS:

1) SOURCE: HAYES D.B.
BRIT. J. APPL. PHYS. 45, 1208, (1974)
2) EXPERIMENTAL TECHNIQUE: 12 SAMPLE IMPACTED ON QUARTZ GAUGE.
DATA REDUCTION METHOD : G
3) THE DATA INDICATES THAT TRANSFORMATION FROM THE NA-CL TO THE CS-CL

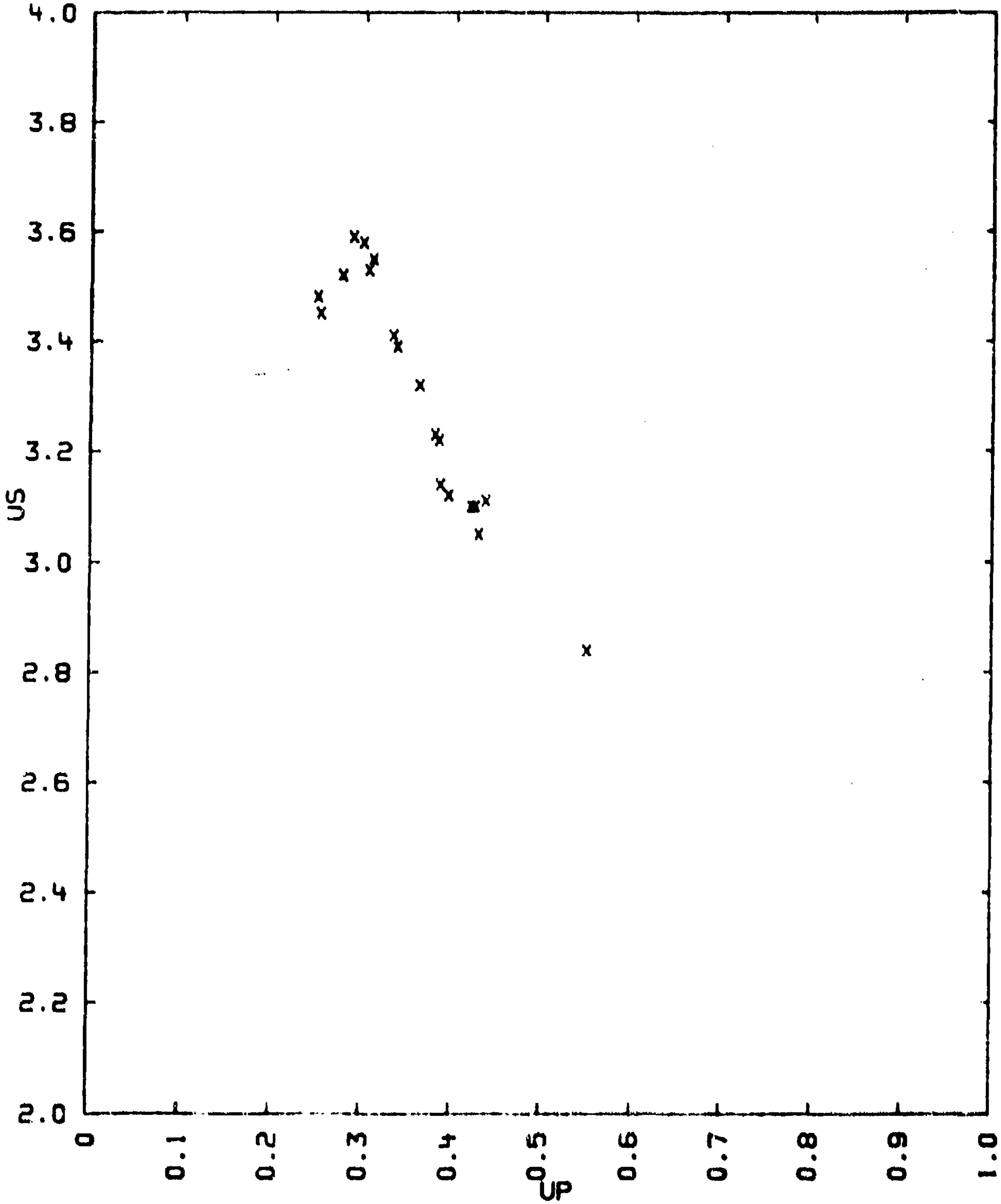
STRUCTURE IS INCOMPLETE BETWEEN 20.9 AND 31 KBARS, BUT RAPID: MORE THAN 500 O/(O.MUSEC). A SUBSEQUENT SLOWER TRANSFORMATION (ABOUT 25 O/(O.MUSEC) APPEARS TO GO TO COMPLETION IN THE (111) SAMPLES.

4) VO1 CALCULATED FROM THE CUBIC CELL CONSTANT OF 6.29294 ANGSTROM AT 25 DEG.C. WYCKOFF, CRYSTAL STRUCTURES (JOHN WILEY AND SONS N.Y. '63)

5) CO WAS CALCULATED FROM THE ELASTIC CONSTANTS C11 = 4.09E+11 AND C12 = 0.706E+11 DYNES/CM**2

TABLE I

POTASSIUM CHLORIDE
100-10---4



100-11---1
POTASSIUM BROMIDE

K-BR

V0 = 0.384 CC/G
V01 = 0.3811 CC/G

CB = 2.33 KM/SEC

IN THE TABLE BELOW DENSITY, IS GIVEN IN G/CC, VELOCITIES IN KM/SEC AND PRESSURE IN KILOBARS. SH DESIGNATES SAMPLE HOLDER.

TABLE

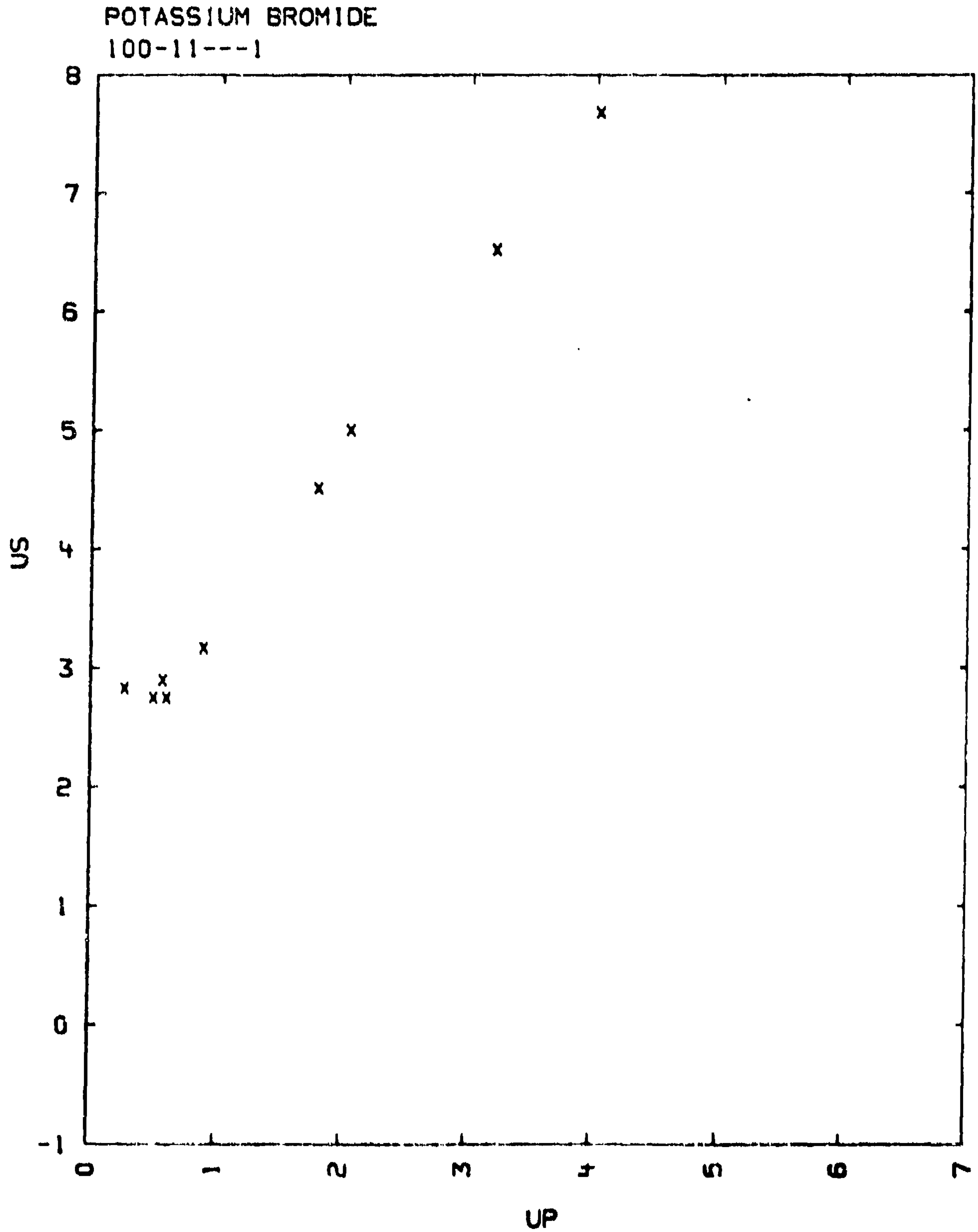
RHO0	US	UP	P	V/V0	SH	UP(SH)
2.75	2.82	0.27	21.0	0.9050	CU	0.17
-	2.75	0.50	37.5	0.8183	CU	0.30
-	2.89	0.57	45.3	0.8032	CU	0.35
-	2.74	0.61	46.0	0.7782	CU	0.37
-	3.16	0.90	78.2	0.7153	AL	0.69
-	4.51	1.80	223.0	0.6013	AL	1.50
-	4.99	2.05	280.0	0.5900	AL	1.74
-	6.52	3.20	574.5	0.5092	AL	2.82
-	7.68	4.02	849.0	0.4762	FE	2.80

US = 1.93 + 1.44 UP KM/SEC FOR UP BETWEEN 0.8 AND 4.0 KM/SEC
SIG US = 0.08

COMMENTS:

1) SOURCE: AL'TSHULER, L.V., PAVLOVSKII, M.M., KULESHOVA, L.V., AND SIMAKOV, G.V.
SOVIET PHYS.-SOLID STATE, VOL. 5, P. 203 (1963)
2) EXPERIMENTAL TECHNIQUE A
DATA REDUCTION TECHNIQUE B.
3) THE SAMPLES WERE POSITIONED ON PLATES OF CU AL AND FE AS INDICATED IN TABLE COLUMN 6.
THE HUGONIOTS OF FE CU AND AL WERE OBTAINED FROM
AL'TSHULER, L.V., KORMER, S.B., BAKANOVA, A.A. AND TRUNIN, R.F.
JETP VOL 11, P.573 (1960)
4) THE AL AND CU ADIABAT WERE OBTAINED BY REFLECTING THE HUGONIOT IN THE P VS UP PLANE. CORRECTIONS WERE MADE FOR FE.
5) OTHER CONSTANTS LISTED ARE: DEBYE TEMPERATURE 177 DEG. K
HEAT CAPACITY (CV) 0.416 J/G/DEG.
CATION TO ANION DISTANCE 3.293 KX
EXPANSION COEFFICIENT 0.000118 PER DEG
6) POINTS WITH UP = 0.6 OR LESS CORRESPOND TO A DOUBLE SHOCK REGION IN WHICH ONLY THE FIRST WAVE WAS MEASURED.
7) THE VALUE OF V01 LISTED WAS OBTAINED FROM A CATION TO ANION DISTANCE OF 3.298 A. A.C.A. MONOGRAM NUMBER 5 (AMERICAN CRYSTALLOGRAPHIC ASSN., POLYCRYSTAL BOOK SERVICE, BROOKLYN 1963) 2ND ED.

TABLE I



100-11---2
POTASSIUM BROMIDE

K-BR SINGLE CRYSTAL

VO = 0.387 CC/G
VOI = 0.3831 CC/G

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN MM/MICROSEC, AND PRESSURE IN KILOBARS.

TABLE

RHOO	US	UFS	UP	P	V/VO	PRESSURE IN AL BASE PLATE
2.730	3.52	2.25	1.18	112	0.670	165
2.728	4.08	2.94	1.46	161	0.641	225
2.731	4.56	3.63	1.74	218	0.620	293
2.72	4.88	4.07	1.97	264	0.596	347

US = 1.564 + 1.704 UP MM/MICROSEC
SIGMA US = 0.049

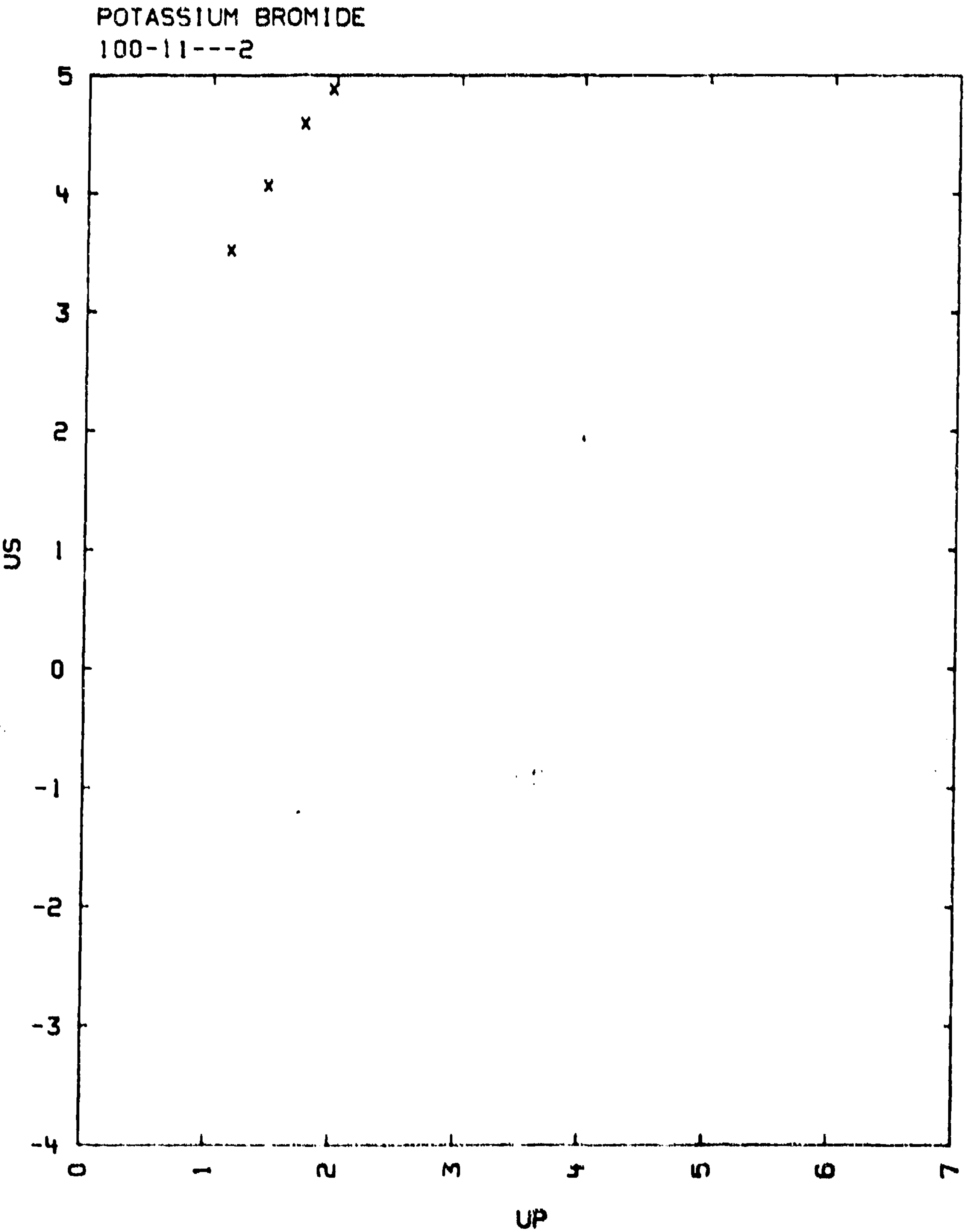
COMMENTS:

1) SOURCE: COMPILER
L. R. L. EQUATION OF STATE FILE
LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA
2) EXPERIMENTAL TECHNIQUE B (ALUMINUM STANDARD BASE PLATE)
DATA REDUCTION TECHNIQUE B.
3) TABULATED DATA ALSO REPORTED BY CHRISTIAN, R.H., IN
EQUATION OF STATE OF ALKALI HALIDES AT HIGH PRESSURE (THESIS)
UCRL-4900 MAY 15, 1957 UNIVERSITY OF CALIFORNIA,
LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA.
4) ALSO LISTED IN REFERENCE OF COMMENT 3 ARE:

DEBYE TEMPERATURE	177 DEG. K
HEAT CAPACITY (CV)	0.41 J/G/DEG.
EXPANSION COEFFICIENT	0.000120 PER DEG.
COMPRESSIBILITY	6.70 PER MEGABAR
MELTING POINT	735 DEG. C

5) THE VALUE OF VOI WAS OBTAINED FROM A LATTICE CONSTANT OF 6.598 A
A.C.A. MONOGRAPH NUMBER 5 (AMERICAN CRYSTALLOGRAPHIC ASSOCIATION,
POLYCRYSTAL BOOK SERVICE 1963) 2ND EDITION.

TABLE I



100-11---3
POTASSIUM BROMIDE

K-BR

VO = 0.3634 CC/G.
VOI = 0.3631 CC/G.

IN THE TABLES BELOW, DENSITY IS GIVEN IN G/CC., VELOCITIES IN KM/SEC., AND PRESSURE IN KILOBARS. ST DESIGNATES THE STANDARD MATERIAL AND UP(ST) IS THE PARTICLE VELOCITY OF THE STANDARD.

TABLE
SINGLE CRYSTAL

RHOO	US	UP	P	V/VO	ST	UP(ST)
2.752	4.95	2.03	276	0.588	AL	1.72
-	8.93	5.09	1250	0.429	FE	3.60
-	9.65	5.83	1550	0.395	FE	4.13
-	10.43	6.39	1830	0.388	FE	4.56
-	10.33	6.57	1870	0.364	AL	6.03
-	12.92	8.80	3130	0.321	FE	6.33
-	15.01	10.60	4380	0.294	AL	9.95

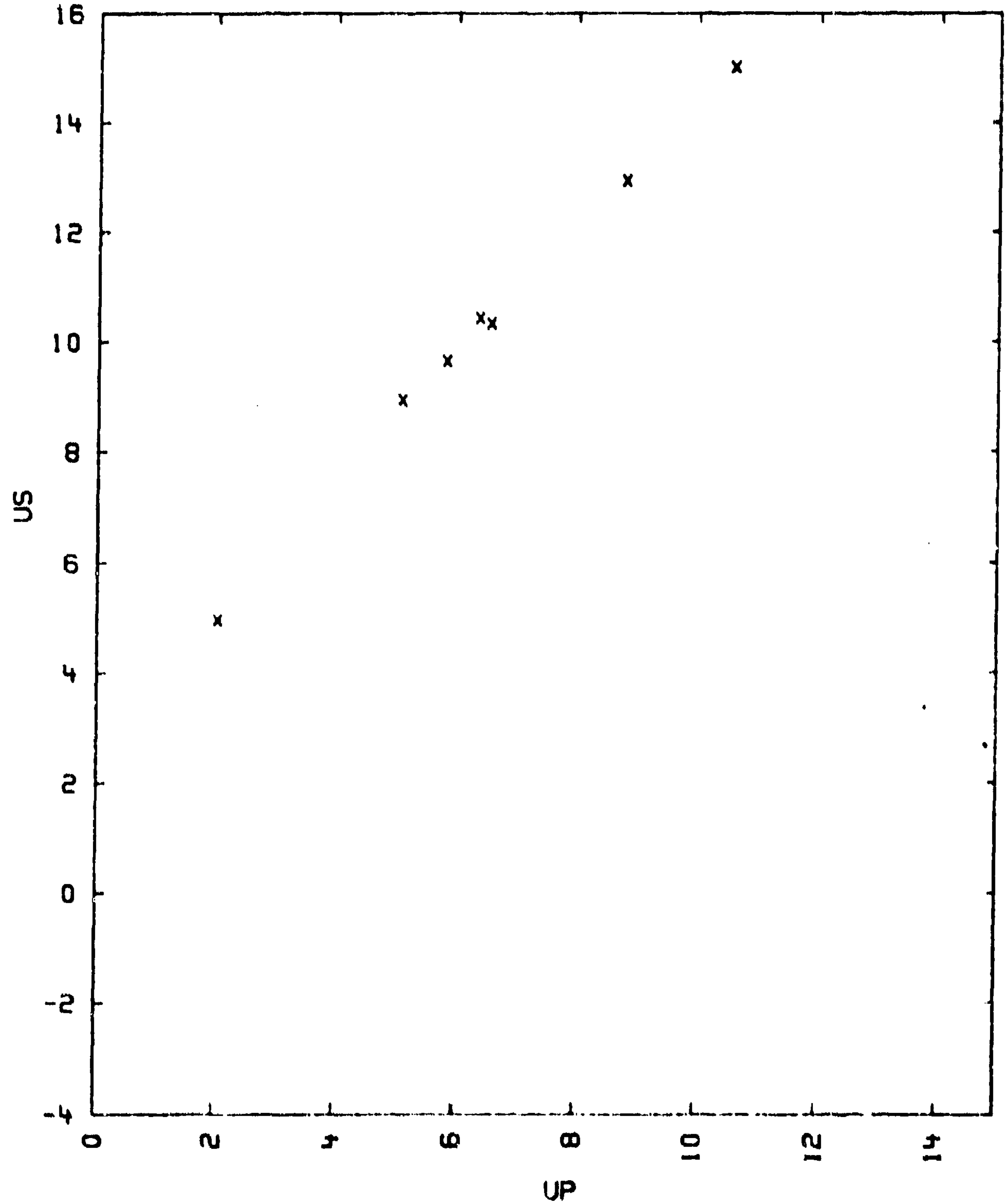
US = 3.23 + 1.106 UP KM/SEC. FOR US FROM 8.9 TO 15.0 KM/SEC.
SIGMA US = 0.12 KM/SEC.

COMMENTS:

1) SOURCE: KORMER, S. B., SINITSYN, M. V., FUNTIKOV, A. I., URLIN, V. D. AND BLINOV, A. V.
SOVIET PHYS-JETP, VOL. 20, P. 811 (1965)
J. EXPTL. THEORET. PHYS. (U.S.S.R.) VOL. 47, P. 1202 (1964)
2) EXPERIMENTAL TECHNIQUE A
DATA REDUCTION TECHNIQUE B
3) VOI WAS OBTAINED FROM A LATTICE CONSTANT OF 6.596 ANGSTROMS. A.C.A. MONOGRAPH NUMBER 5 (AMERICAN CRYSTALLOGRAPHIC ASSOCIATION, POLYCRYSTAL BOOK SERVICE 1963) 2ND ED.
4) THE MEASURED EXPERIMENTAL ERROR IN THE SHOCK VELOCITY BELOW 10 KM/SEC IS 1 PERCENT OR LESS AND FOR THE HIGHER VALUES THE ERROR IS APPROXIMATELY 2 PERCENT. THE VALUE OF THE SHOCK VELOCITY WAS DETERMINED FROM 5-8 EXPERIMENTS.
5) ADDITIONAL CONSTANTS LISTED:
HEAT CAPACITY = 0.4194 JOULES/G/DEG.
BAND GAP = 6.6 EV.
6) THE ALUMINUM STANDARD HUGONIOT IS CHARACTERIZED BY THE FOLLOWING RELATIONSHIP: US = 5.254 + 1.458*UP - 0.0276*UP**2 + 0.00103*UP**3
SIGMA US = 0.013 KM/SEC. FOR UP = 0 TO 10.5 KM/SEC
RHOO = 2.71 G/CC.

TABLE I

POTASSIUM BROMIDE
100-11---3



100-12---1
POTASSIUM IODIDE

K-I SINGLE CRYSTAL

VO = 0.321 CC/G
VOI = 0.3120 CC/G

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN MM/MICROSEC, AND PRESSURE IN KILOBARS.

TABLE

RHOO	US	UFS	UP	P	V/VO	PRESSURE IN AL BASE PLATE
3.105	3.28	2.20	1.10	110	0.668	156
3.11	3.70	2.80	1.40	161	0.624	219
3.10	4.22	3.52	1.72	227	0.594	293
3.140	4.47	4.07	1.99	278	0.555	356

US = 1.787 + 1.372 UP MM/MICROSEC
SIGMA US = 0.063

COMMENTS:

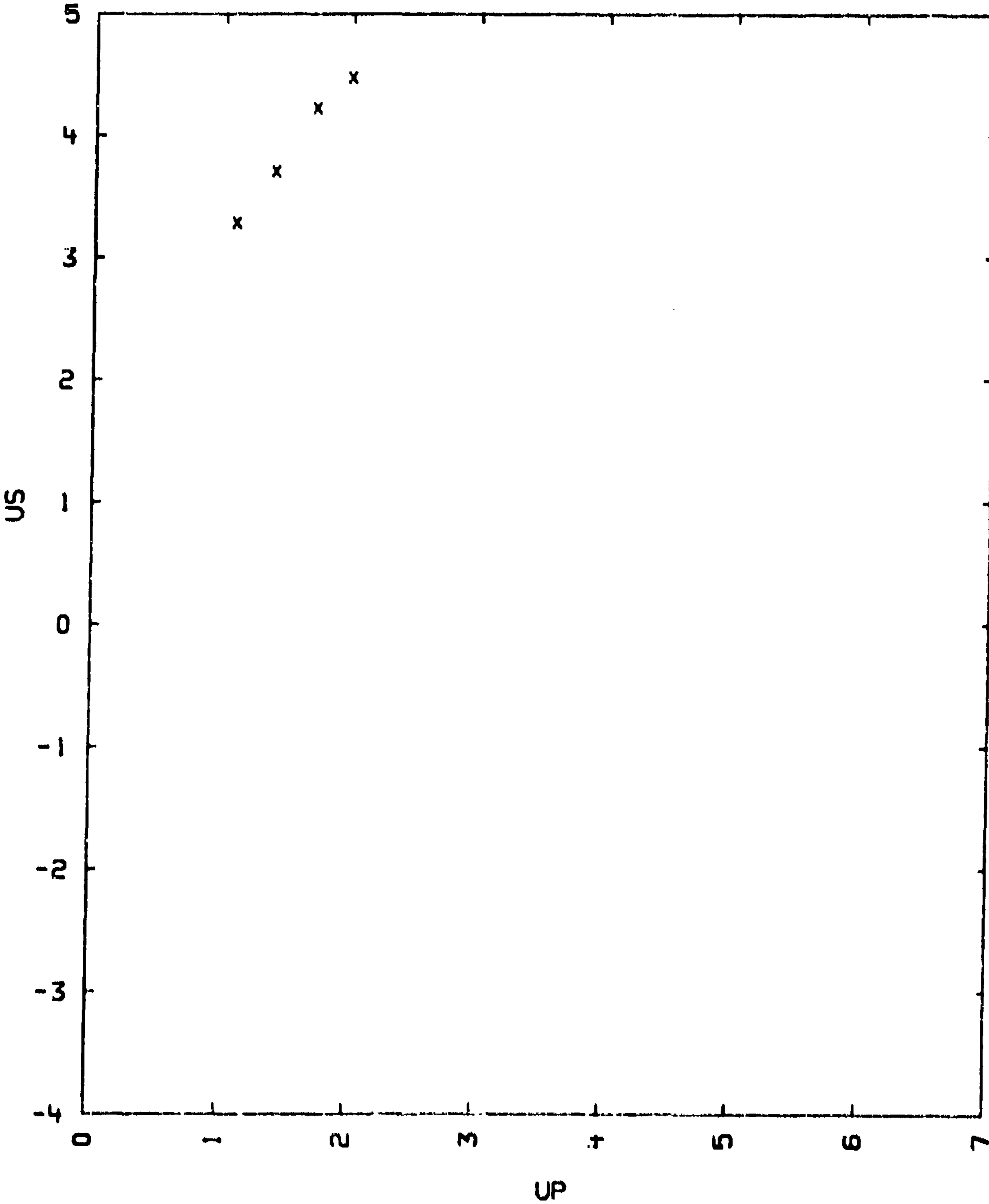
1) SOURCE: COMPILER
L. R. L. EQUATION OF STATE FILE
LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA
2) EXPERIMENTAL TECHNIQUE B (ALUMINUM STANDARD BASE PLATE)
DATA REDUCTION TECHNIQUE B.
3) TABULATED DATA ALSO REPORTED BY CHRISTIAN, R.H., IN
EQUATION OF STATE OF ALKALI HALIDES AT HIGH PRESSURE (THESIS)
UCRL-4900 MAY 16, 1957 UNIVERSITY OF CALIFORNIA,
LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA.
4) ALSO LISTED IN REFERENCE OF COMMENT 3 ARE:

DEBYE TEMPERATURE	132 DEG. K
HEAT CAPACITY (CV)	0.30 J/G/DEG.
EXPANSION COEFFICIENT	0.000122 PER DEG.
COMPRESSIBILITY	8.53 PER MEGABAR
MELTING POINT	685 DEG. C

5) THE VALUE OF VOI WAS OBTAINED FROM A LATTICE CONSTANT OF 7.066 A
A.C.A. MONOGRAPH NUMBER 5 (AMERICAN CRYSTALLOGRAPHIC ASSOCIATION,
POLYCRYSTAL BOOK SERVICE 1963) 2ND EDITION.

TABLE I

POTASSIUM IODIDE
100-12---1



100-29-24-1---1
MICROCLINE, ONTARIO (POTASSIUM ALUMINUM SILICATE)

K-AL-SI3-O8 PURITY SEE COMMENT 3

VO = 0.3905-0.3922 CC/G CL(001)=6.95 KM/SEC
VOI= 0.3902-0.3894 CC/G

THE TABLE LISTS DENSITY IN G/CC VELOCITY IN KM/SEC. AND PRESSURE IN KBAR
MAT IS THE BASE PLATE- OR STANDARD MATERIAL: AL=ALUMINUM, BR=BRASS

TABLE

SAMPLE											STANDARD	
RHOO	US1	UP1	P1	V1/VO	US2	UP2	UFS	P2	V2/VO	D	MAT	UFS
2.561	7.19	0.438	80.7	0.939	3.97	[illegible].795	1.98	115.	0.844	3.31	AL	1.69
2.550	7.09	-	79.2	0.938	5.22	2.10	4.04	295.	0.612	4.81	-	3.60
2.561	7.32	-	82.1	0.940	6.44	2.69	5.28	450.	0.587	4.83	-	4.80
2.561	7.56	-	84.8	0.942	6.58	2.66	5.23	455.	0.600	3.32	-	-
2.561	7.14	3.13	572.	0.562			6.12			4.82	BR	4.40
2.561	7.19	-	576.	0.565			6.10			3.32	-	-

US =

COMMENTS:

1) SOURCE: AHRENS T.J., PETERSEN, C.F. AND ROSENBERG, J.T.
J. GEOPHYS. RES. VOL. 74, P. 2727 (1969)
2) EXPERIMENTAL TECHNIQUE CI (INCLINED MIRROR)
DATA REDUCTION METHOD B AND DI (ELASTIC WAVES)
3) THE SAMPLES WERE OBTAINED FROM WARDS NATIONAL SCIENCE ESTABLISHMENT
NO PURITY ANALYSIS IS GIVEN. THE DENSITY IS INSIGNIFICANTLY DIFFERENT
FROM MAXIMUM MICROCLINE FROM PONTISKALK SWITZERLAND (FINNEY AND BAI-
LEY, Z. KRIST. 119, P413 (1964))
4) VOI FROM TWO SOURCES IN CRYSTAL DATA DETERMINATIVE TABLES, DONNAY AND
ONDIK EDITORS (U.S. DEP. OF COMMERCE, N.B.S. 1973) V2, EDITION 3
5) CO WAS TAKEN FROM ALEXANDROV, K.S. AND RYZHOVA, T.V.
BULL. USSR. ACAD. OF SCIENSES, GEOPHYS. SER. NO. 2, 129 (1962)

TABLE I

MICROCLINE, ONTARIO (POTASSIUM ALUMINUM SILICATE)

100-29-24-1---1

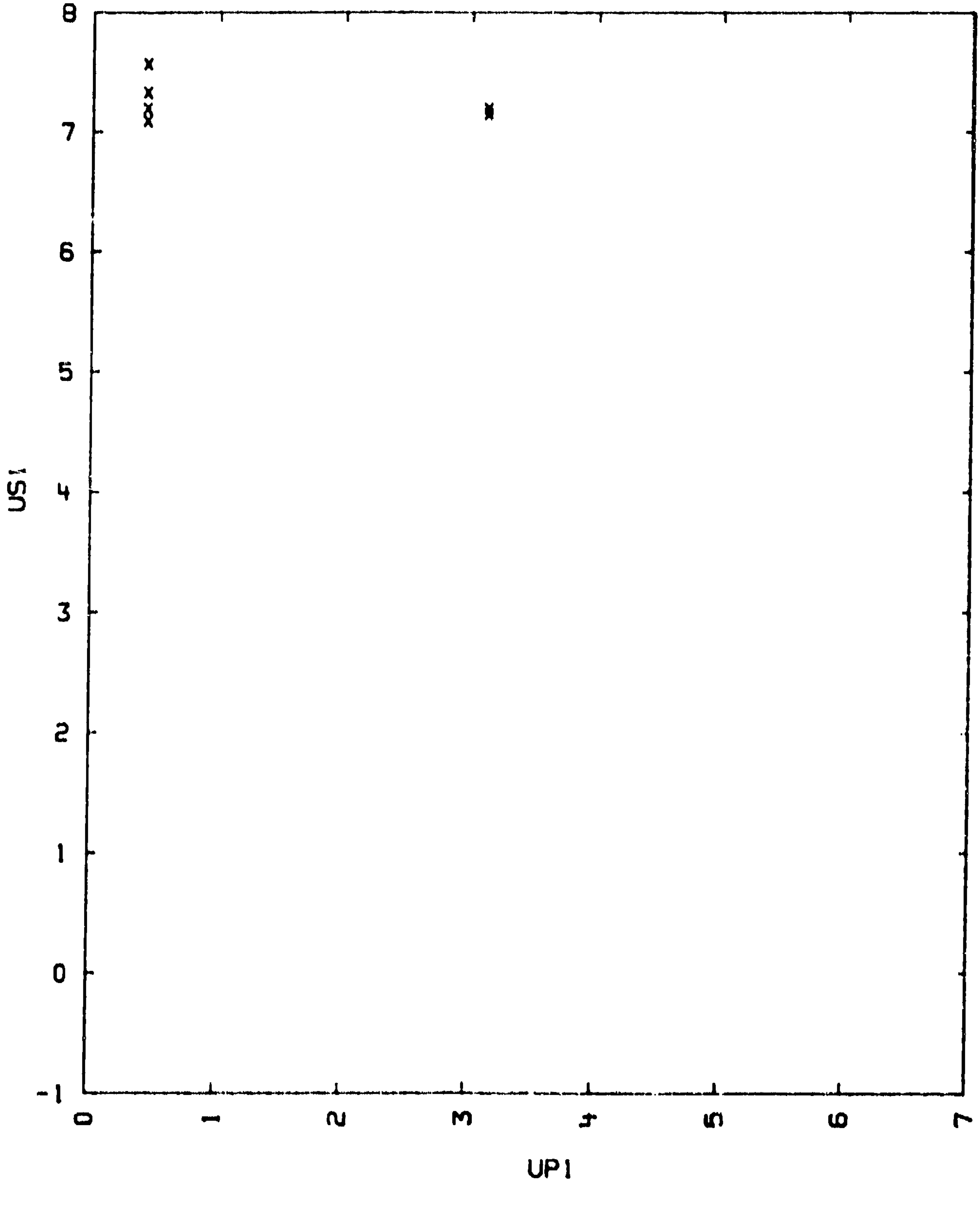
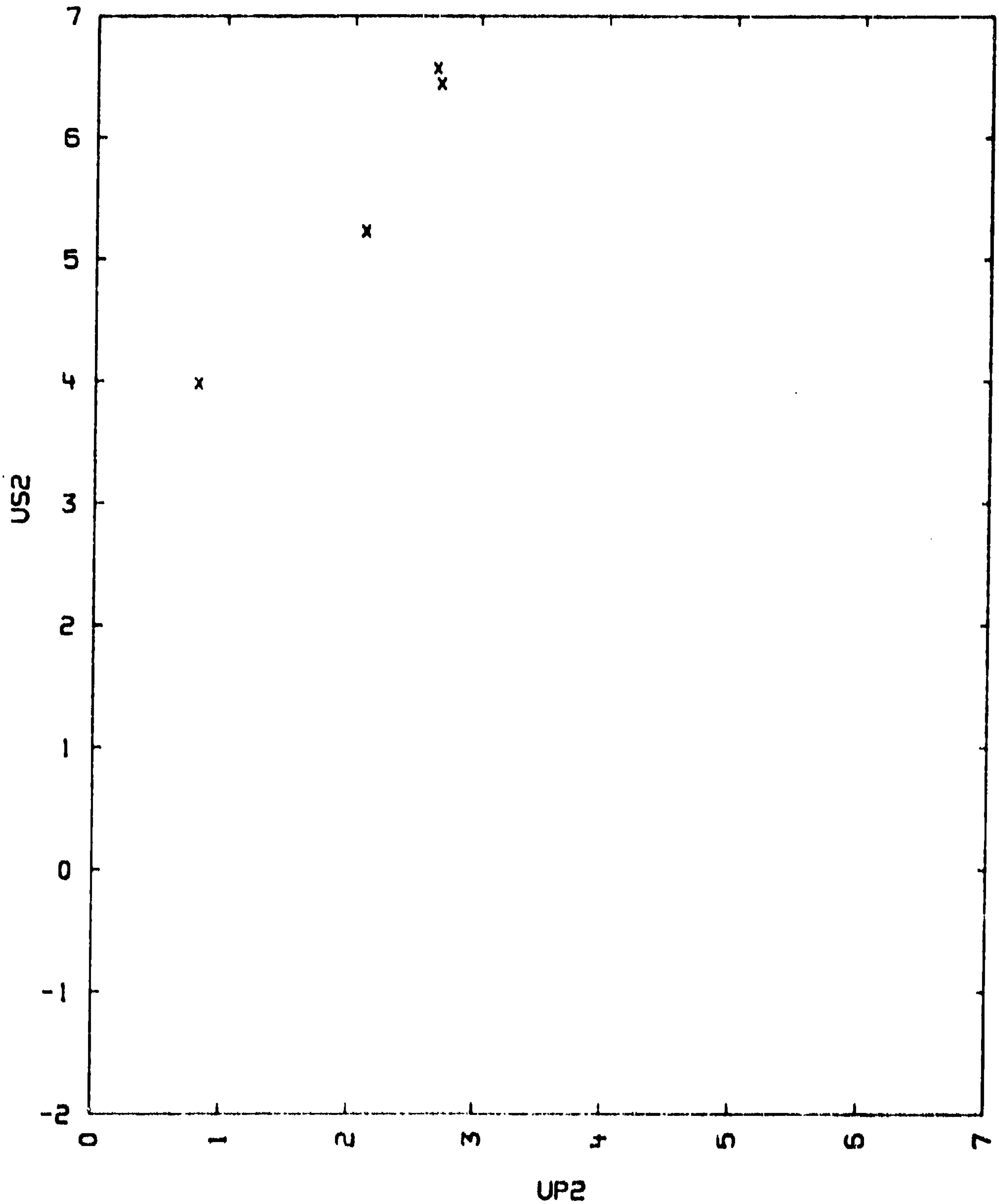


TABLE I

MICROCLINE, ONTARIO (POTASSIUM ALUMINUM SILICATE)

100-29-24-1---1



101-9---1
RUBIDIUM FLUORIDE

RB-F PRESSED

VO = 0.265-0.270 CC/G
VOI = 0.259 CC/G

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN MM/MICROSEC, AND PRESSURE IN KILOBARS.

TABLE

RHOO	US	UFS	UP	P	V/VO	PRESSURE IN AL BASE PLATE
3.748	4.83	3.61	1.94	351	0.598	363
3.769	4.66	3.45	1.75	307	0.625	341
3.753	3.86	-	1.28	185	0.669	218
3.741	3.67	2.37	1.29	177	0.649	215
3.700	3.22	1.51	0.83	99	0.742	124
3.768	2.86	0.94	0.50	54	0.825	70

US = 2.067 + 1.419 UP MM/MICROSEC.
SIGMA US = 0.136 MM/MICROSEC.

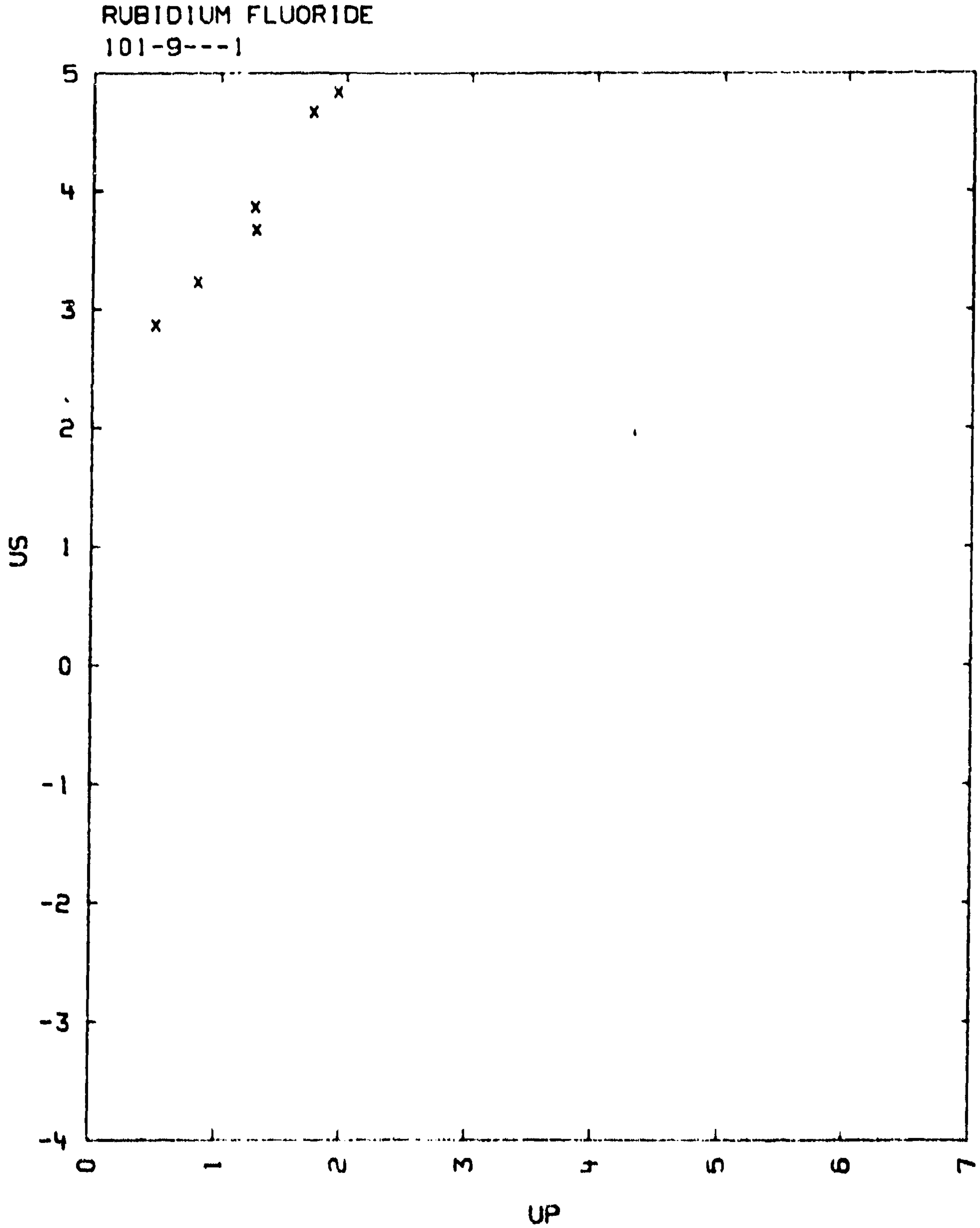
COMMENTS:

1) SOURCE: COMPILER
L. R. L. EQUATION OF STATE FILE
LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA
2) EXPERIMENTAL TECHNIQUE B (ALUMINUM STANDARD BASE PLATE)
DATA REDUCTION TECHNIQUE B.
3) THE FOLLOWING DATA WAS OBTAINED FROM CHRISTIAN, R. H., EQUATION OF STATE OF ALKALI HALIDES AT HIGH PRESSURE (THESIS) UCRL-4900 MAY 16, 1957. UNIVERSITY OF CALIFORNIA LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA:

DEBYE TEMPERATURE	238 DEG. K
HEAT CAPACITY (CV)	0.48 J/G/DEG.
EXPANSION COEFFICIENT	0.00010 PER DEG.
COMPRESSIBILITY	4.0 PER MEGABAR
MELTING POINT	775 DEG. C

4) THE VALUE OF VOI WAS OBTAINED FROM A LATTICE CONSTANT OF 5.64 A A.C.A. MONOGRAPH NUMBER 5 (AMERICAN CRYSTALLOGRAPHIC ASSOCIATION, POLYCRYSTAL BOOK SERVICE, BROOKLYN, N.Y., 1963) 2ND ED.

TABLE I



101-10---1
RUBIDIUM CHLORIDE

RB-CL PRESSED

VO = 0.369 CC/G
VOI = 0.3496 CC/G

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN MM/MICROSEC, AND PRESSURE IN KILOBARS.

TABLE

RHOO	US	UFS	UP	P	V/VO	PRESSURE IN AL BASE PLATE
2.752	3.43	2.25	1.16	109	0.663	162
2.685	3.91	2.81	1.44	151	0.632	218
2.725	4.48	3.67	1.82	222	0.594	304
2.690	4.87	4.04	2.04	268	0.581	360

US = 1.565 + 1.615 UP MM/MICROSEC
SIGMA US= 0.024

COMMENTS:

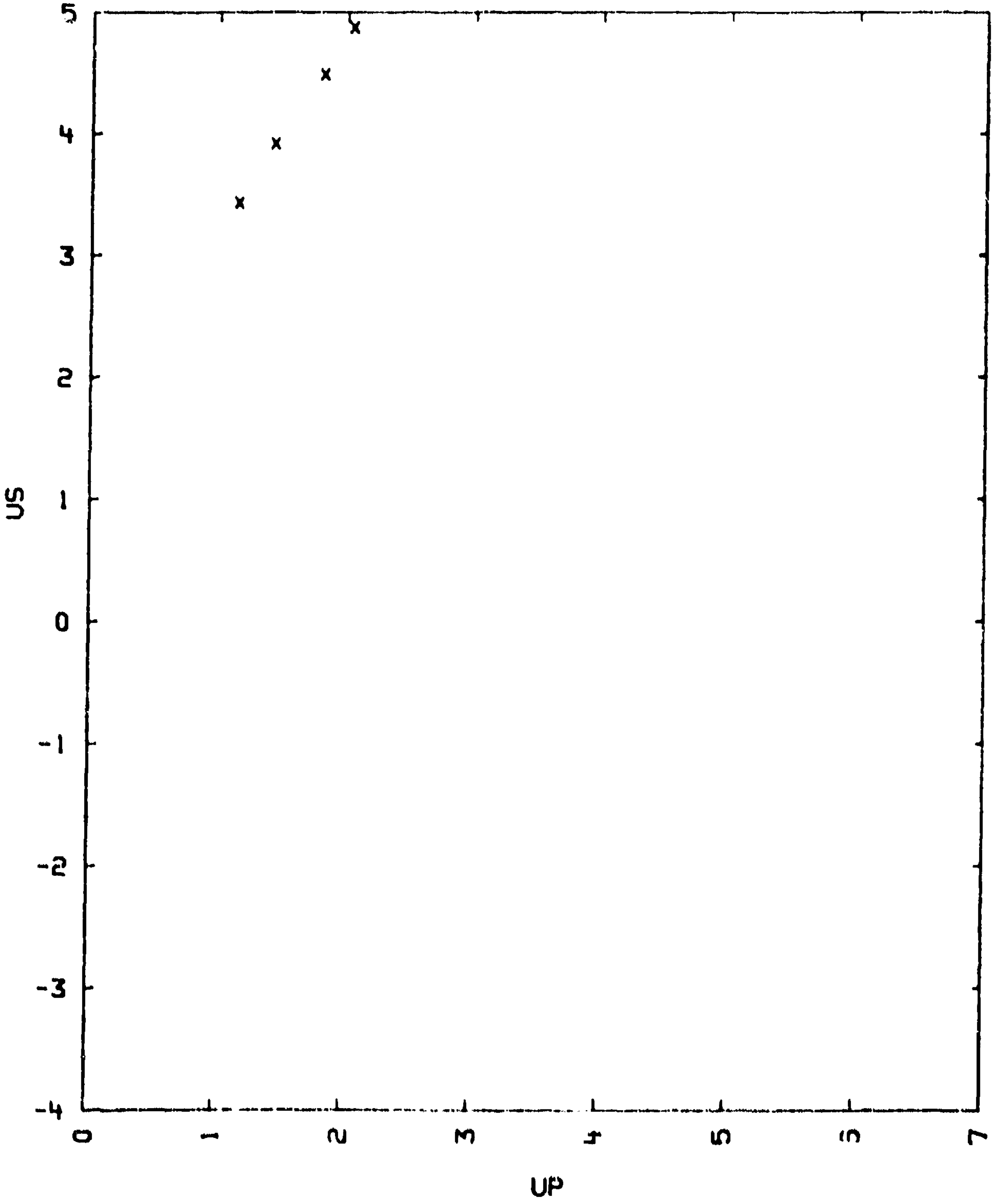
1) SOURCE: COMPILER
L. R. L. EQUATION OF STATE FILE
LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA
2) EXPERIMENTAL TECHNIQUE B (ALUMINUM STANDARD BASE PLATE)
DATA REDUCTION TECHNIQUE B.
3) TABULATED DATA ALSO REPORTED BY CHRISTIAN, R.H., IN
EQUATION OF STATE OF ALKALI HALIDES AT HIGH PRESSURE (THESIS)
UCRL-4900 MAY 16, 1957 UNIVERSITY OF CALIFORNIA,
LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA.
4) ALSO LISTED IN REFERENCE OF COMMENT 3 ARE:

DEBYE TEMPERATURE	179 DEG. K
HEAT CAPACITY (CV)	0.40 J/G/DEG.
EXPANSION COEFFICIEN	0.00011 PER DEG.
COMPRESSIBILITY	6.65 PER MEGABAR
MELTING POINT	722 DEG. C

5) THE VALUE OF VOI HAS OBTAINED FROM A LATTICE CONSTANT OF 6.548 A
A.C.A. MONOGRAPH NUMBER 5 (AMERICAN CRYSTALLOGRAPHIC ASSOCIATION,
POLYCRYSTAL BOOK SERVICE 1963) 2ND EDITION.

TABLE I

RUBIDIUM CHLORIDE
101-10---1



101-11---1
RUBIDIUM BROMIDE

RB-BR PRESSED

VO = 0.304 CC/G
VOI = 0.2949 CC/G

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN MM/MICROSEC, AND PRESSURE IN KILOBARS.

TABLE

RHOO	US	UFS	UP	P	V/VO	PRESSURE IN AL BASE PLATE
3.285	3.16	2.08	1.08	112	0.659	156
3.295	3.62	2.67	1.38	163	0.619	218
3.300	4.16	3.51	1.73	237	0.585	300
3.298	4.44	3.96	1.96	286	0.559	356

US = 1.585 + 1.470 UP MM/MICROSEC
SIGMA US = 0.031

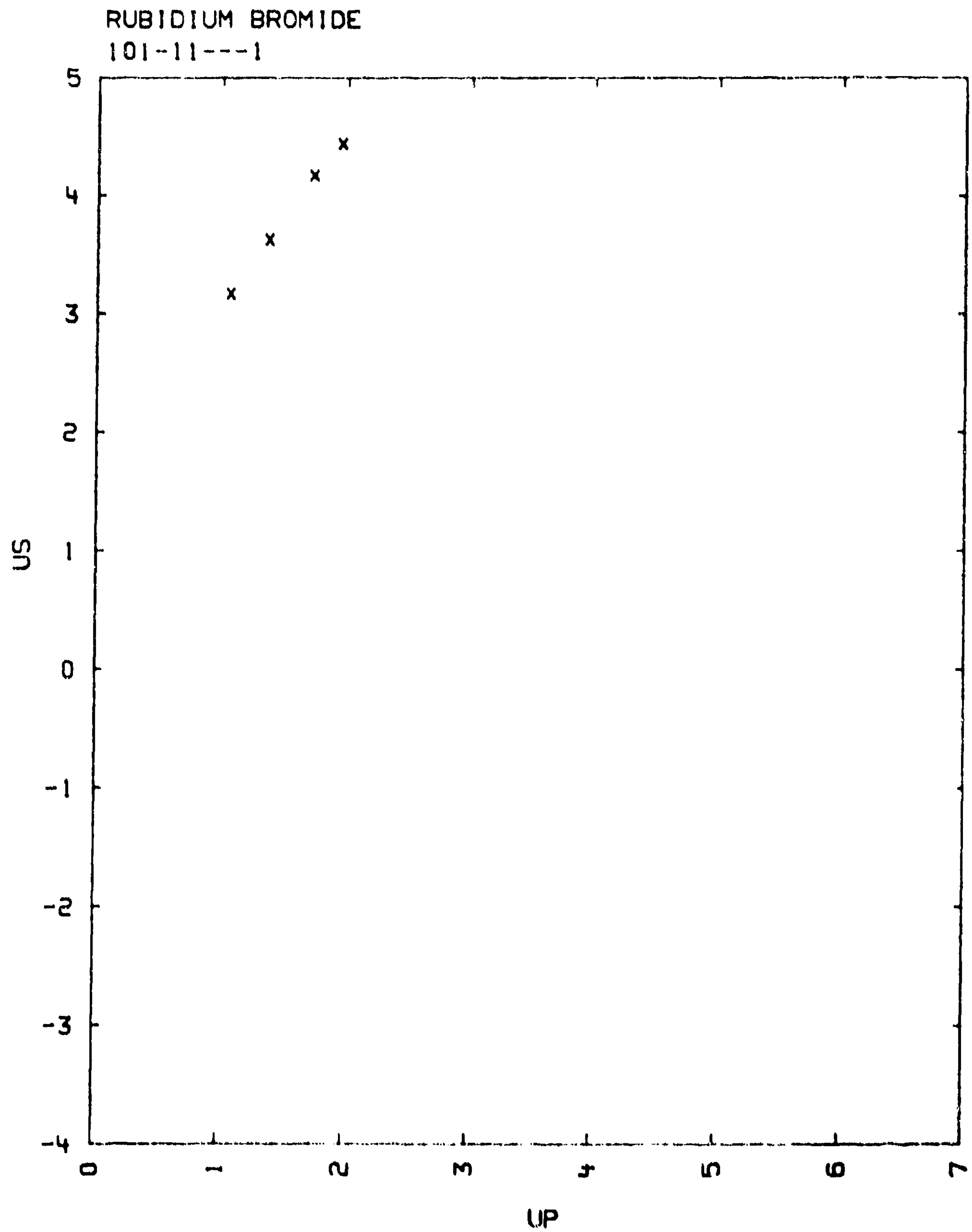
COMMENTS:

1) SOURCE: COMPILER
L. R. L. EQUATION OF STATE FILE
LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA
2) EXPERIMENTAL TECHNIQUE B (ALUMINUM STANDARD BASE PLATE)
DATA REDUCTION TECHNIQUE B.
3) TABULATED DATA ALSO REPORTED BY CHRISTIAN, R.H., IN EQUATION OF STATE OF ALKALI HALIDES AT HIGH PRESSURE (THESIS) UCRL-4900 MAY 16, 1957 UNIVERSITY OF CALIFORNIA, LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA.
4) ALSO LISTED IN REFERENCE OF COMMENT 3 ARE:

DEBYE TEMPERATURE	140 DEG. K
HEAT CAPACITY (CV)	0.30 J/G/DEG.
EXPANSION COEFFICIENT	0.00011 PER DEG.
COMPRESSIBILITY	7.94 PER MEGABAR
MELTING POINT	692 DEG. C

5) THE VALUE OF VOI WAS OBTAINED FROM A LATTICE CONSTANT OF 6.868 A A.C.A. MONOGRAPH NUMBER 5 (AMERICAN CRYSTALLOGRAPHIC ASSOCIATION, POLYCRYSTAL BOOK SERVICE 1963) 2ND EDITION.

TABLE I



101-12---1
RUBIDIUM IODIDE

RB-I PRESSED

VO = 0.288 CC/G
VOI = 0.2804 CC/G

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN MM/MICROSEC, AND PRESSURE IN KILOBARS.

TABLE

RHOO	US	UFS	UP	P	V/VO	PRESSURE IN AL BASE PLATE
3.500	3.01	2.21	1.11	117	0.631	160
3.448	3.44	2.75	1.37	163	0.603	218
3.457	3.95	3.53	1.73	235	0.562	300
3.480	4.24	4.05	1.91	279	0.550	347

US = 1.337 + 1.518 UP MM/MICROSEC
SIGMA US = 0.021

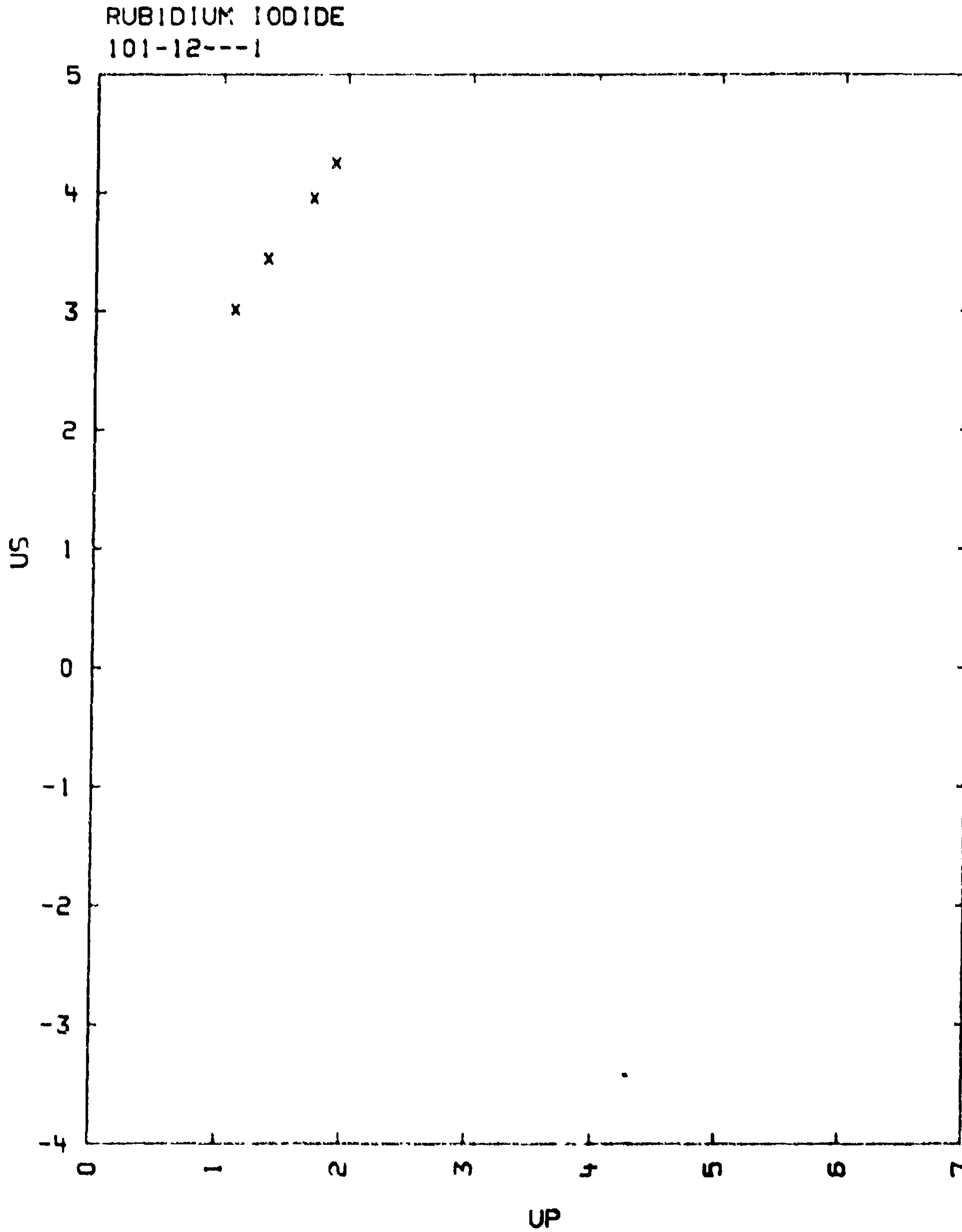
COMMENTS:

1) SOURCE: COMPILER
L. R. L. EQUATION OF STATE FILE
LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA
2) EXPERIMENTAL TECHNIQUE B (ALUMINUM STANDARD BASE PLATE)
DATA REDUCTION TECHNIQUE B.
3) TABULATED DATA ALSO REPORTED BY CHRISTIAN, R.H., IN
EQUATION OF STATE OF ALKALI HALIDES AT HIGH PRESSURE (THESIS)
UCRL-4900 MAY 16, 1957 UNIVERSITY OF CALIFORNIA,
LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA.
4) ALSO LISTED IN REFERENCE OF COMMENT 3 ARE:

DEBYE TEMPERATURE	110 DEG. K
HEAT CAPACITY (CV)	0.23 J/G/DEG.
EXPANSION COEFFICIENT	1.20 PER DEG.
COMPRESSIBILITY	9.58 PER MEGABAR
MELTING POINT	647 DEG. C

5) THE VALUE OF VOI WAS OBTAINED FROM A LATTICE CONSTANT OF 7.340 A
A.C.A. MONOGRAPH NUMBER 5 (AMERICAN CRYSTALLOGRAPHIC ASSOCIATION,
POLYCRYSTAL BOOK SERVICE 1963) 2ND EDITION.

TABLE I



102-10---1
CESIUM CHLORIDE

CS-CL PRESSED

VO = 0.253 CC/G
VOI = 0.2504 CC/G

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN MM/MICROSEC, AND PRESSURE IN KILOBARS.

TABLE

RHOO	US	UFS	UP	P	V/VO	PRESSURE IN AL BASE PLATE
3.960	2.92	-	0.51	60	0.825	73
3.960	3.75	2.12	1.04	154	0.723	174
3.955	3.85	2.33	1.13	172	0.707	194
3.946	4.47	3.17	1.53	270	0.658	292
3.952	4.70	3.58	1.72	318	0.636	342

US = 2.182 + 1.481 UP MM/MICROSEC
SIGMA US = 0.029

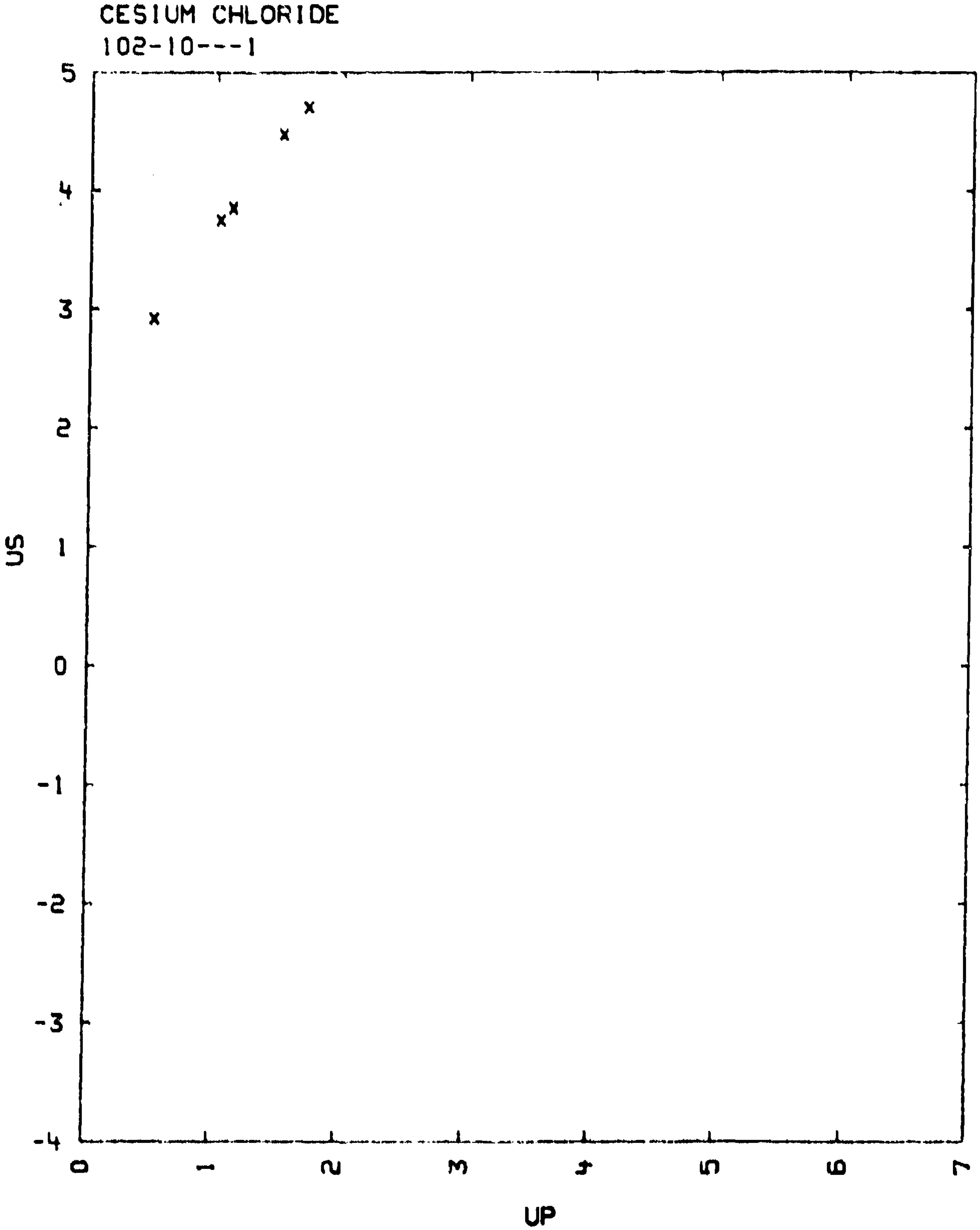
COMMENTS:

1) SOURCE: COMPILER
L. R. L. EQUATION OF STATE FILE
LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA
2) EXPERIMENTAL TECHNIQUE B (ALUMINUM STANDARD BASE PLATE)
DATA REDUCTION TECHNIQUE B.
3) TABULATED DATA ALSO REPORTED BY CHRISTIAN, R.H., IN
EQUATION OF STATE OF ALKALI HALIDES AT HIGH PRESSURE (THESIS)
UCRL-4900 MAY 18, 1957 UNIVERSITY OF CALIFORNIA,
LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA.
4) ALSO LISTED IN REFERENCE OF COMMENT 3 ARE:

DEBYE TEMPERATURE	150 DEG. K
HEAT CAPACITY (CV)	0.29 J/G/DEG.
EXPANSION COEFFICIENT	0.000138 PER DEG.
COMPRESSIBILITY	5.95 PER MEGABAR
MELTING POINT	645 DEG. C

5) THE VALUE OF VOI WAS OBTAINED FROM A LATTICE CONSTANT OF 4.121 A
A.C.A. MONOGRAPH NUMBER 5 (AMERICAN CRYSTALLOGRAPHIC ASSOCIATION, POLYCRYSTAL BOOK SERVICE, BROOKLYN, N.Y., 1963) 2ND ED.

TABLE I



102-11---1
CESIUM BROMIDE

CS-BR SINGLE CRYSTAL

V0 = 0.226 CC/G
V01 = 0.2244 CC/G

C0 = 1.89 KM/SEC
CB = 1.86 KM/SEC

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN MM/MICROSEC, AND PRESSURE IN KILOBARS.

TABLE

RHOO	US	UFS	UP	P	V/VO	PRESSURE IN AL BASE PLATE
4.414	3.41	1.94	0.97	146	0.716	160
4.446	3.83	2.57	1.25	213	0.672	230
4.433	4.15	3.16	1.52	280	0.632	296
4.427	4.38	3.58	1.69	328	0.614	343
4.443	6.54	-	3.52	1023	0.461	1009
4.430	6.08	6.73	2.93	786	0.518	773
4.439	4.55	4.00	1.81	366	0.602	378

US = 2.253 + 1.256 UP MM/MICROSEC
SIGMA US = 0.094

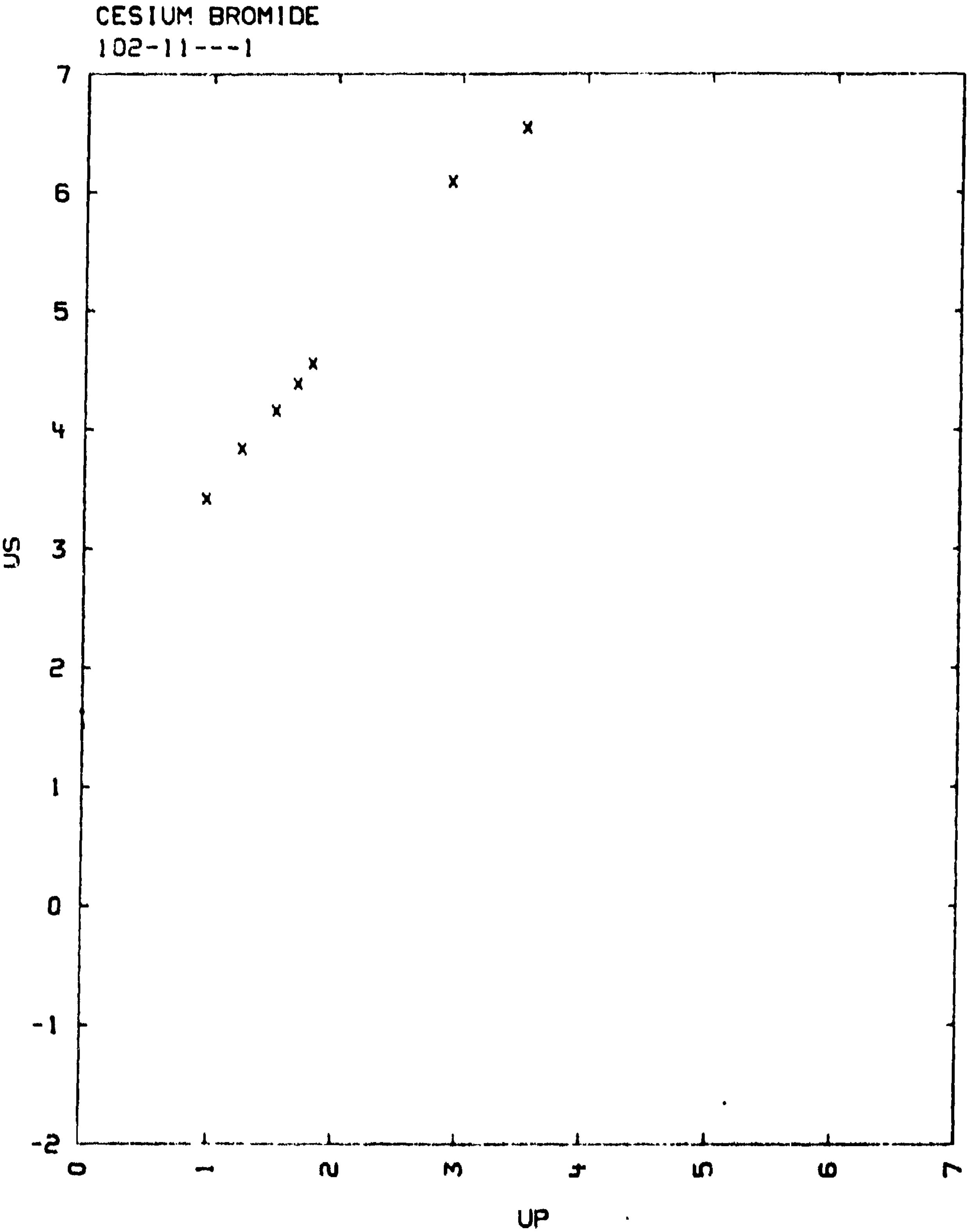
COMMENTS:

1) SOURCE: COMPILER
L. R. L. EQUATION OF STATE FILE
LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA
2) EXPERIMENTAL TECHNIQUE B (ALUMINUM STANDARD BASE PLATE)
DATA REDUCTION TECHNIQUE B.
3) PART OF THE TABULATED DATA ALSO REPORTED BY CHRISTIAN, R. H., IN EQUATION OF STATE OF ALKALI HALIDES AT HIGH PRESSURE (THESIS) UCRL-4900 MAY 16, 1957 UNIVERSITY OF CALIFORNIA, LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA.
4) ALSO LISTED IN REFERENCE OF COMMENT 3 ARE:

DEBYE TEMPERATURE	114 DEG. K
HEAT CAPACITY (CV)	0.23 J/G/DEG.
EXPANSION COEFFICIENT	0.000116 PER DEG.
COMPRESSIBILITY	7.06 PER MEGABAR
MELTING POINT	638 DEG. C

5) THE VALUE OF V01 WAS OBTAINED FROM A LATTICE CONSTANT OF 4.296 A A.C.A. MONOGRAPH NUMBER 5 (AMERICAN CRYSTALLOGRAPHIC ASSOCIATION, POLYCRYSTAL BOOK SERVICE 1963) 2ND EDITION.
6) C0 WAS OBTAINED FROM ELASTIC CONSTANTS GIVEN BY P. J. REDDY AND A. L. RUOFF, PHYS. SOLIDS AT HIGH PRESSURE& IN PRINT& (1965)

TABLE I



102-11---2
CESIUM BROMIDE

CS-BR

VO = 0.2247 CC/G
VOI = 0.2244 CC/G

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC., VELOCITIES IN KM/SEC., AND PRESSURE IN KILOBARS. ST DESIGNATES THE STANDARD MATERIAL AND UP(ST) IS THE PARTICLE VELOCITY IN THE STANDARD

TABLE I
SINGLE CRYSTAL

RHOO	US	UP	P	V/VO	ST	UP(ST)
4.45	3.17	0.75	110	0.763	AL	0.69
-	4.52	1.73	347	0.617	AL	1.70
-	5.92	2.75	720	0.535	AL	2.82
-	8.17	4.60	1670	0.437	FE	3.60
-	9.33	5.69	2360	0.391	AL	6.03
-	13.19	9.29	5450	0.296	AL	9.95

US = 2.15 + 1.414 UP - 0.0245 UP**2 KM/SEC. SIGMA US = 0.06 KM/SEC.

VO = 0.339-0.495 CC/G.

TABLE II
POROUS

RHOO	US	UP	P	V/VO	ST	UP(ST)
2.95	3.90	1.99	228	0.490	AL	1.60
-	8.79	5.86	1519	0.334	FE	4.13
2.02	3.71	2.25	169	0.394	AL	1.60
-	8.77	6.33	1122	0.279	FE	4.13

US =

COMMENTS:

1) SOURCE: KORMER, S. B., SINITSYN, M. V., FUNTIKOV, A. I., URLIN, V. D. AND BLINOV, A. V.
SOVIET PHYS-JETP, VOL. 20, P. 811 (1965)
J. EXPTL. THEORET. PHYS. (U.S.S.R.) VOL. 47, P. 1202 (1964)
2) EXPERIMENTAL TECHNIQUE A
DATA REDUCTION TECHNIQUE B
3) VOI WAS CALCULATED FROM A LATTICE CONSTANT OF 4.296 ANGSTROMS, A.C.A. MONOGRAPH NUMBER 5 (AMERICAN CRYSTALLOGRAPHIC ASSOCIATION, POLYCRYSTAL BOOK SERVICE 1963) 2ND ED.
4) THE MEASURED EXPERIMENTAL ERROR IN THE SHOCK VELOCITY BELOW 10 KM/SEC IS 1 PERCENT OR LESS AND FOR THE HIGHER VALUES THE ERROR IS APPROXIMATELY 1.5 PERCENT. THE VALUE OF THE SHOCK VELOCITY WAS

DETERMINED FROM S-B EXPERIMENTS.

5) ADDITIONAL CONSTANTS LISTED:

HEAT CAPACITY = 0.2355 JOULES/G/DEG.
BAND GAP = 6.0 EV.

6) THE ALUMINUM STANDARD HUGONIOT IS CHARACTERIZED BY THE FOLLOWING RELATIONSHIP: US = 5.254 + 1.458*UP - 0.0276*UP**2 + 0.00103*UP**3
SIGMA US = 0.013 KM/SEC. FOR UP = 0 TO 10.5 KM/SEC
RHOO = 2.71 G/CC.

TABLE I

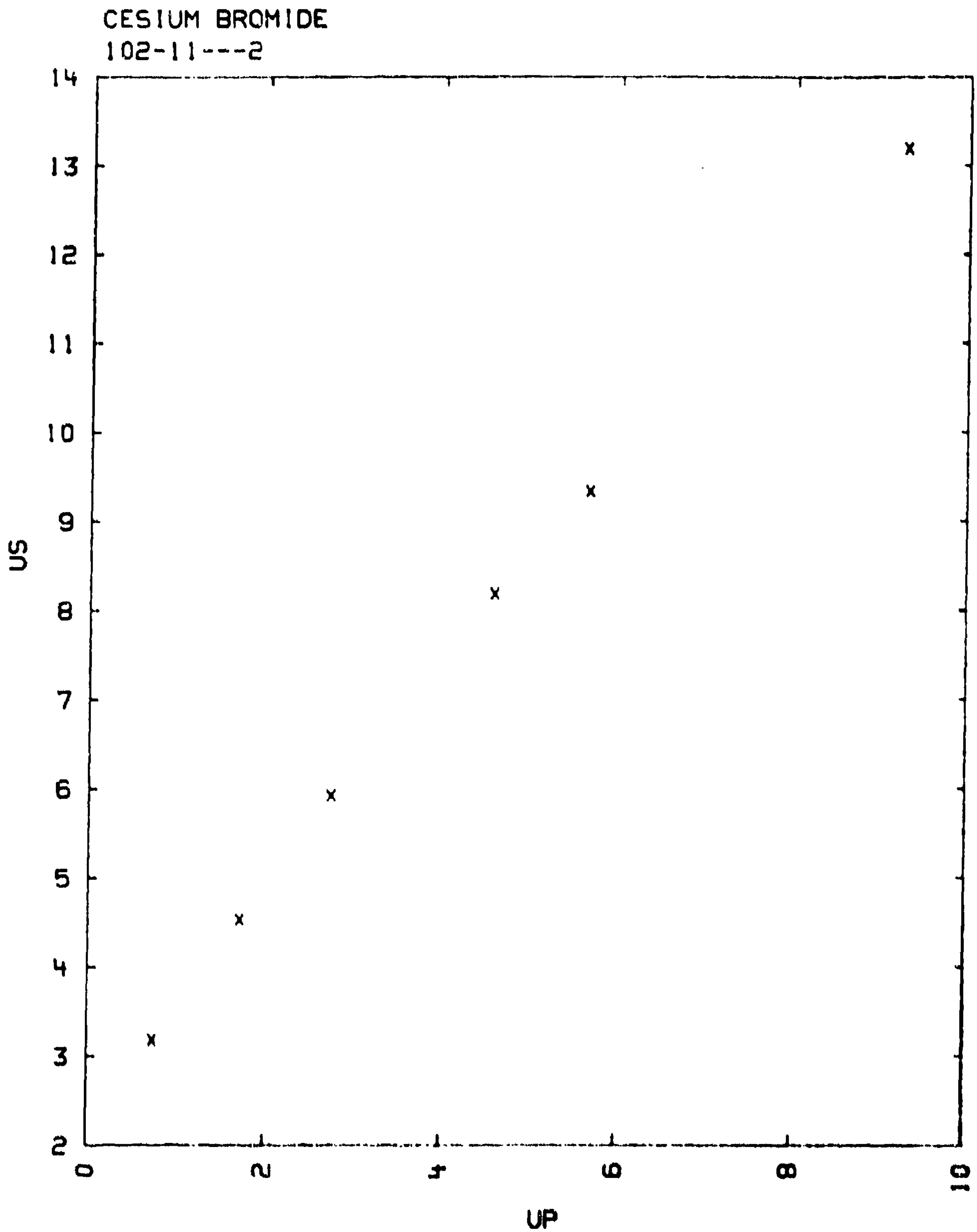
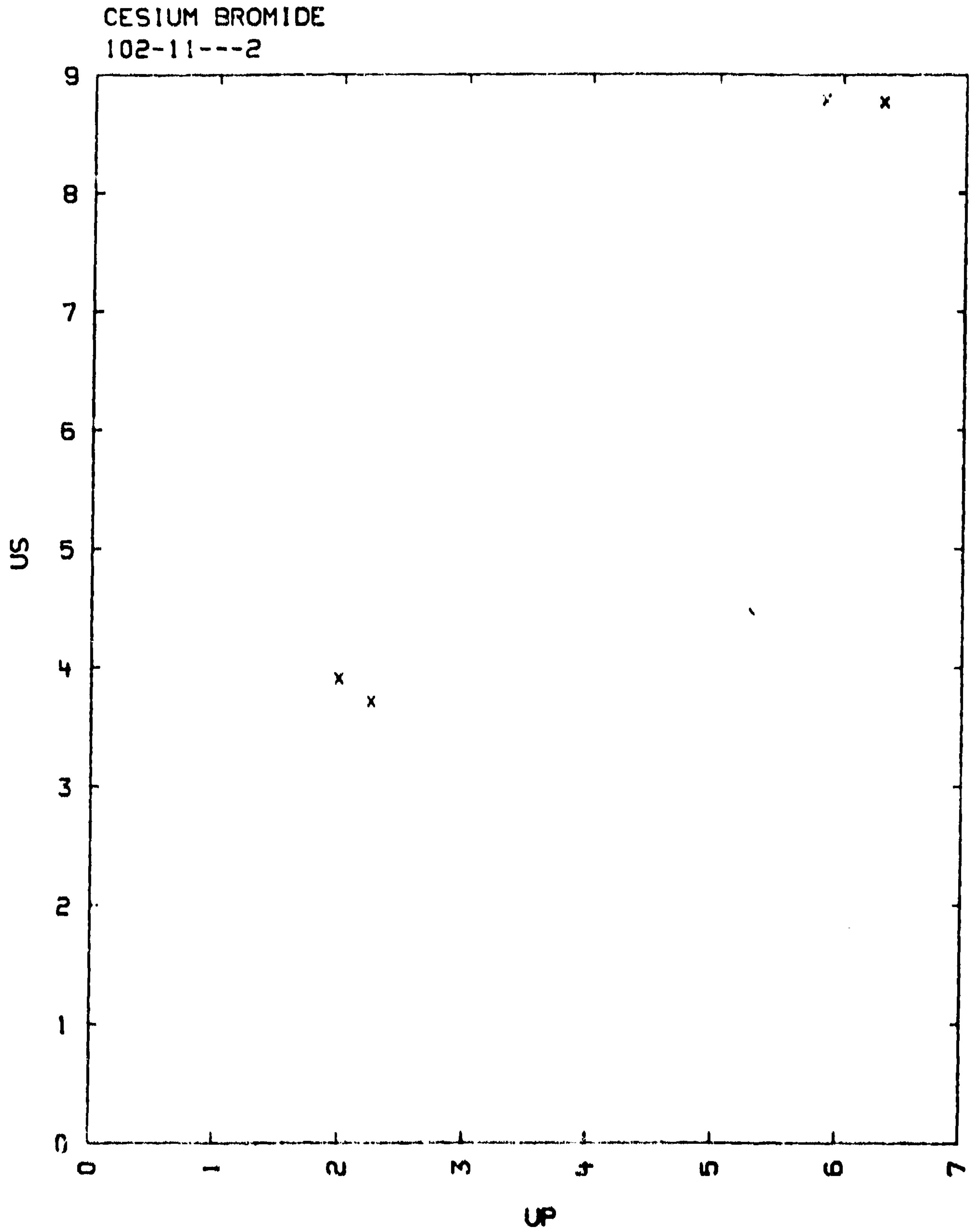


TABLE II



102-12---1
CESIUM IODIDE

CS-1

VO = 0.2217 CC/G
VOI = 0.2208 CC/G   CB = 1.54 KM/SEC

IN THE TABLE BELOW DENSITY IS GIVEN IN G/CC, VELOCITY IN KM/SEC AND PRESSURE IN KILOBARS. SH DESIGNATES SAMPLE HOLDER.

TABLE

RHOO	US	UP	P	V/VO	SH	UP(SH)
4.51	2.57	0.56	64.0	0.7837	CU	0.37
-	2.80	0.81	102.5	0.7137	AL	0.69
-	3.98	1.56	279.5	0.6086	AL	1.50
-	4.32	1.79	348.3	0.5848	AL	1.74
-	5.63	2.80	710.0	0.5025	AL	2.82
-	6.64	3.68	1100.2	0.4464	FE	2.80

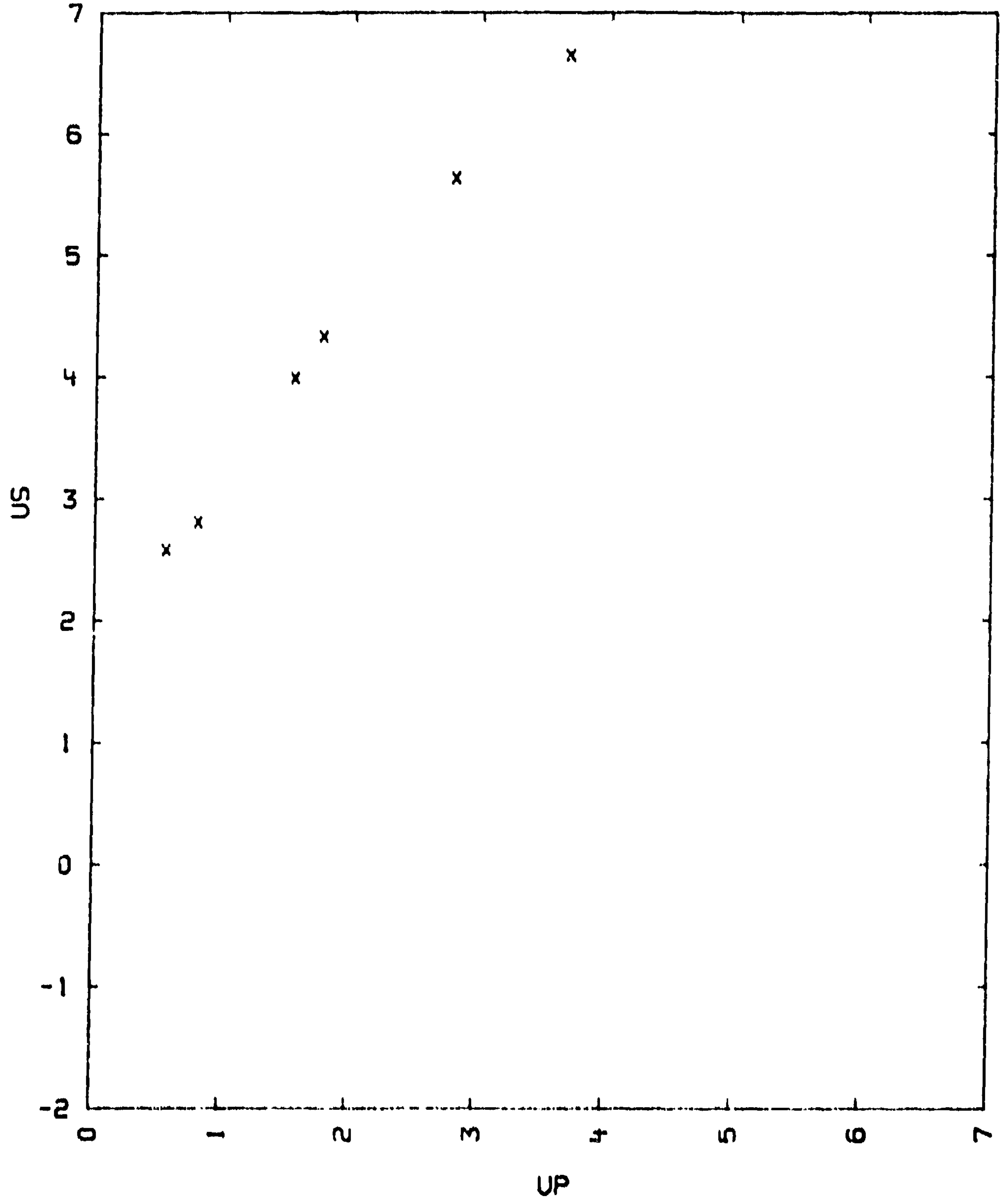
US = 1.61 + 1.63 UP - 0.0706 UP**2 KM/SEC
FOR UP FROM 0.5 TO 3.7 KM/SEC
SIG US = 0.055

COMMENTS:

1) SOURCE: AL'TSHULER, L.V., PAVLOVSKII, M.M., KULESHOVA, L.V., AND SIMAKOV, G.V.
SOVIET PHYS.-SOLID STATE, VOL. 5, P. 203 (1963)
2) EXPERIMENTAL TECHNIQUE A
DATA REDUCTION TECHNIQUE B.
3) THE SAMPLES WERE POSITIONED ON PLATES OF CU AL AND FE AS INDICATED IN TABLE COLUMN 6.
THE HUGONIOTS OF FE CU AND AL WERE OBTAINED FROM
AL'TSHULER, L.V., KORMER, S.B., BAKANOVA, A.A. AND TRUNIN, R.F.
JETP VOL 11, P.573 (1960)
4) THE AL AND CU ADIABAT WERE OBTAINED BY REFLECTING THE HUGONIOT IN THE P VS UP PLANE. CORRECTIONS WERE MADE FOR FE.
5) OTHER CONSTANTS LISTED ARE: DEBYE TEMPERATURE 100 DEG. K
HEAT CAPACITY (CV) 0.185 J/G/DEG.
CATION TO ANION DISTANCE 3.950 KX
EXPANSION COEFFICIENT 0.000146 PER DEG
6) THE VALUE OF VOI WAS OBTAINED FROM A CATION TO ANION DISTANCE OF 3.955 A. A.C.A. MONOGRAPH NUMBER 5 (AMERICAN CRYSTALOGRAPHIC ASSN., POLYCRYSTAL BOOK SERVICE, BROOKLYN 1963) 2ND ED.

TABLE I

CESIUM IODIDE
102-12---1



102-12---2
CESIUM IODIDE

CS-1 SINGLE CRYSTAL

VO = 0.223 CC/G
VOI = 0.2208 CC/G

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN MM/MICROSEC, AND PRESSURE IN KILOBARS

TABLE

RHOO	US	UFS	UP	P	V/VO	PRESSURE IN AL BASE PLATE
4.481	3.12	1.96	1.00	140	0.680	160
4.493	3.51	-	1.23	195	0.649	220
4.481	3.95	-	1.32	233	0.665	298
4.481	4.19	3.62	1.72	323	0.590	345
4.486	3.24	1.98	0.99	144	0.694	164

US = 1.785 + 1.452 UP MM/MICROSEC
SIGMA US = 0.171

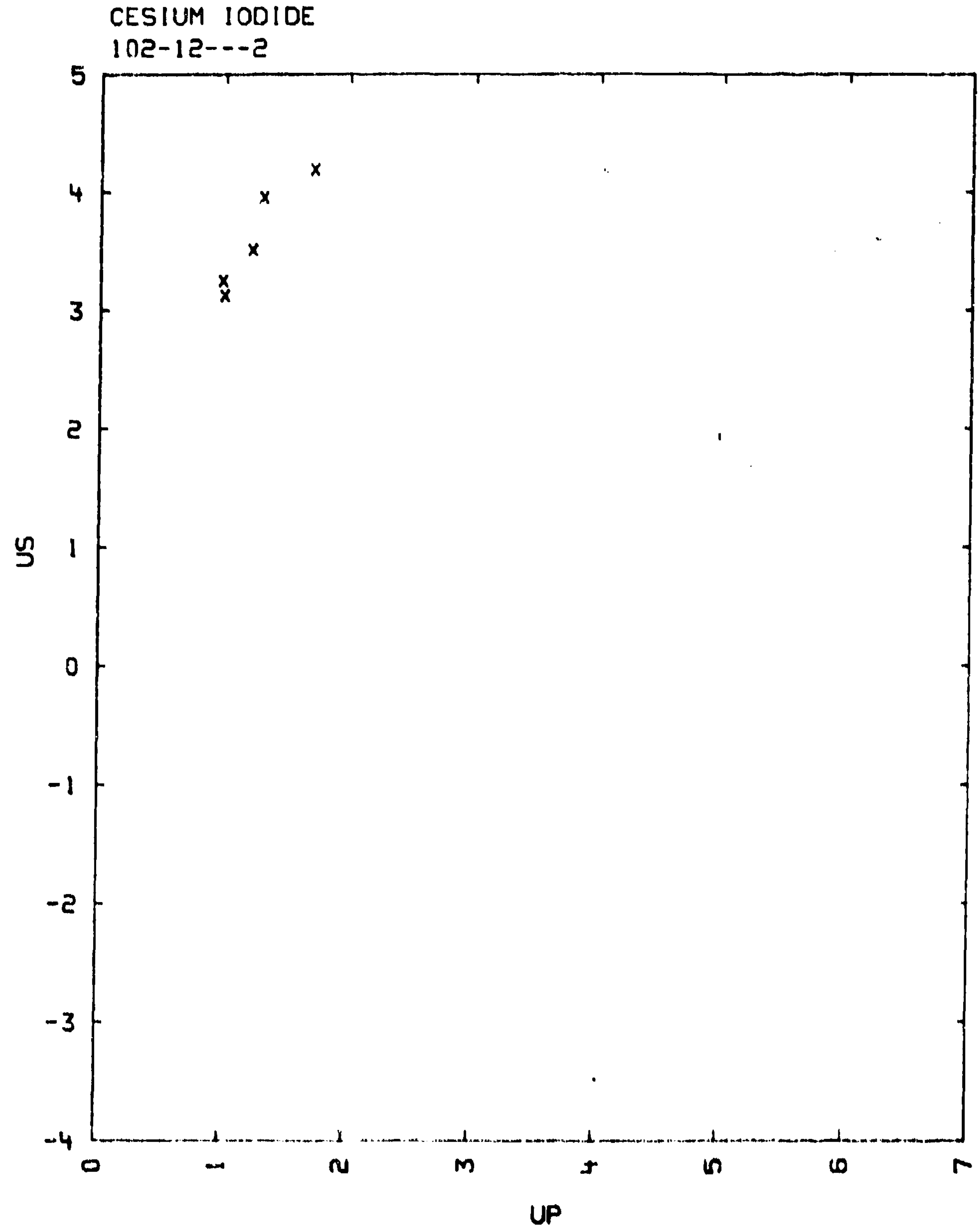
COMMENTS:

1) SOURCE: COMPILER
L. R. L. EQUATION OF STATE FILE
LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA
2) EXPERIMENTAL TECHNIQUE B (ALUMINUM STANDARD BASE PLATE)
DATA REDUCTION TECHNIQUE B.
3) PART OF THE TABULATED DATA ALSO REPORTED BY CHRISTIAN, R. H., IN EQUATION OF STATE OF ALKALI HALIDES AT HIGH PRESSURE (THESIS) UCRL-4900 MAY 16, 1957 UNIVERSITY OF CALIFORNIA, LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA.
4) ALSO LISTED IN REFERENCE OF COMMENT 3 ARE:

DEBYE TEMPERATURE	95 DEG. K
HEAT CAPACITY (CV)	0.19 J/G/DEG.
EXPANSION COEFFICIENT	0.000145 PER DEG.
COMPRESSIBILITY	8.57 PER MEGABAR
MELTING POINT	630 DEG. C

5) THE VALUE OF VOI WAS OBTAINED FROM A LATTICE CONSTANT OF 4.5667 A A.C.A. MONOGRAPH NUMBER 5 (AMERICAN CRYSTALLOGRAPHIC ASSOCIATION, POLYCRYSTAL BOOK SERVICE 1963) 2ND EDITION.

TABLE I



102-12---3
CESIUM IODIDE

CS-1

V0 = 0.222 CC/G
V01 = 0.2208 CC/G

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN KM/SEC, AND PRESSURE IN KILOBARS.

TABLE

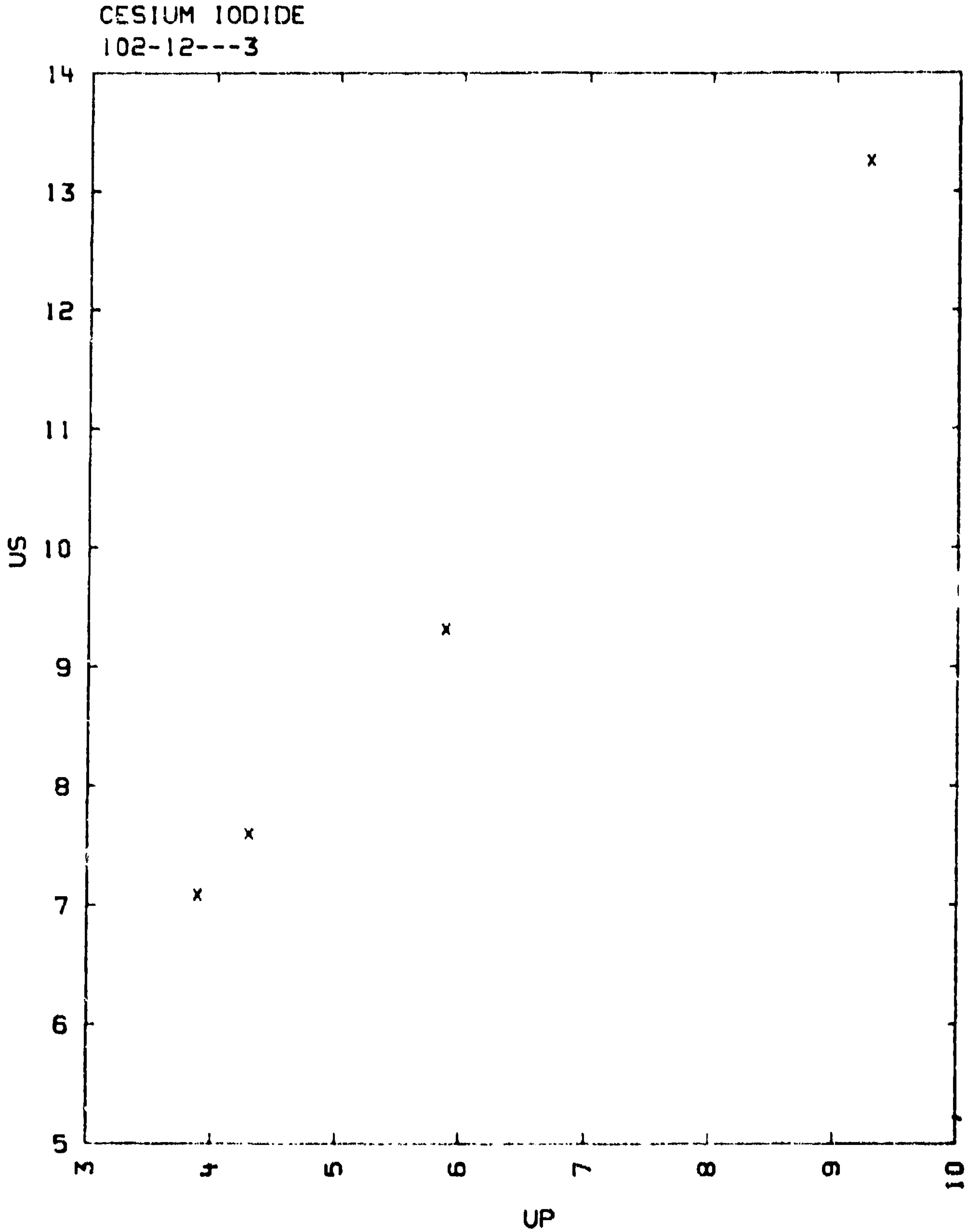
SAMPLE					BASE PLATE	
RHO0	US	UP	P	V/V0	MATERIAL	UP
4.51	7.08	3.90	1245	0.449	AL	4.03
-	7.60	4.30	1474	0.434	FE	3.34
-	9.31	5.88	2469	0.368	SN	4.55
-	13.26	9.28	5540	0.300	AL	7.96

US = 2.03 + 1.14 UP KM/SEC
SIGMA US = 0.050 KM/SEC

COMMENTS:

1) SOURCE: PAVLOVSKII, M. N., VASHCHENKO, V. YA., SIMAKOV, G. V.
FTT VOL. 7, P. 1212 (1965).
SOVIET PHYSICS-SOLID STATE VOL. 7, P. 972 (1965) (TRANSL.)
2) EXPERIMENTAL TECHNIQUE A.
DATA REDUCTION TECHNIQUE B
3) THE VALUE OF V01 WAS OBTAINED FROM A LATTICE CONSTANT OF 4.5667 A
A.C.A. MONOGRAPH NO.5. CRYSTAL DATA DETERMINATIVE TABLES
(AMERICAN CRYSTALLOGRAPHIC ASSOCIATION, 1963) 2ND EDITION.

TABLE I



102-12--4
CESIUM IODIDE, POROUS

CS-1

V0 = 0.398 CC/G
V01 = 0.2208 CC/G

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN KM/SEC, AND PRESSURE IN KILOBARS.

TABLE

SAMPLE					BASE PLATE	
RHO0	US	UP	P	V/V0	MATERIAL	UP
2.51	2.07	1.04	54	0.500	AL	0.69
-	2.88	1.60	116	0.451	AL	1.14
-	3.59	2.00	180	0.443	AL	1.50
-	5.42	3.41	463	0.371	AL	2.70
-	5.55	3.34	465	0.383	AL	2.82
-	6.56	4.23	697	0.355	FE	2.80
-	6.77	4.44	754	0.344	AL	3.71
-	6.99	4.66	817	[illegible]	FE	3.08
-	9.59	6.75	1620	0.296	FE	4.55

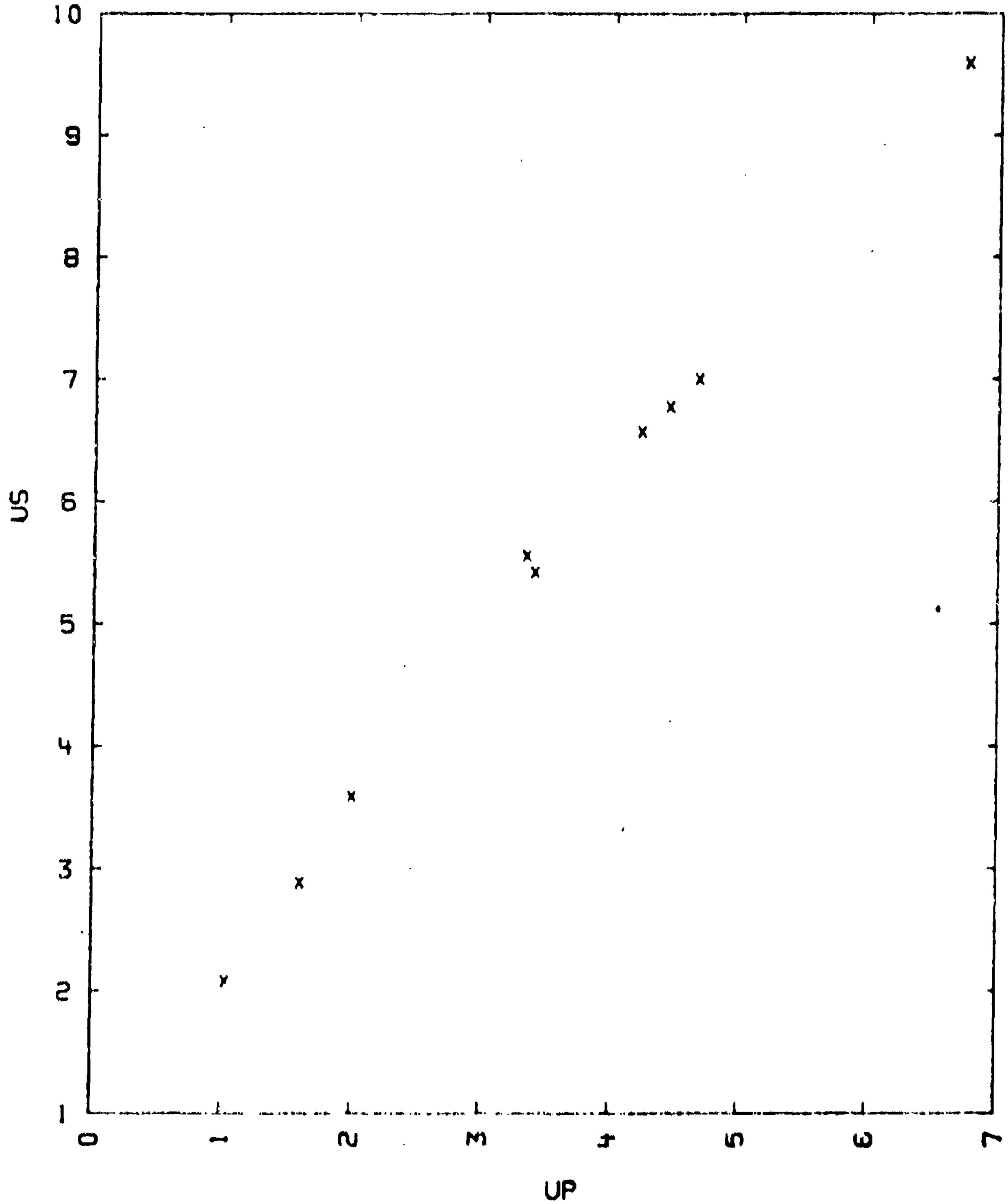
US = 0.89 + 1.32 UP KM/SEC
SIGMA US = 0.157 KM/SEC

COMMENTS:

1) SOURCE: PAVLOVSKII, M. N., VASHCHENKO, V. YA., SIMAKOV, G. V.
FTT VOL. 7, P. 1212 (1965).
SOVIET PHYSICS-SOLID STATE VOL. 7, P. 972 (1965)
2) EXPERIMENTAL TECHNIQUE A.
DATA REDUCTION TECHNIQUE B
3) THE VALUE OF V01 WAS OBTAINED FROM A LATTICE CONSTANT OF 4.5667 A
A.C.A. MONOGRAPH NO.5, CRYSTAL DATA DETERMINATIVE TABLES
(AMERICAN CRYSTALLOGRAPHIC ASSOCIATION, 1963) 2ND EDITION.

TABLE I

CESIUM IODIDE, POROUS
102-12---4



EDIT TEST

BOX V72 PLTR

TV80LIB DD80 OUTPUT............ 12:35:47U 06/14

309 FRAMES PLOTTED

UNCL

BOX V72 PLTR

15:48:15 06/14/77U

XEROX+FILM

EDIT TEST

BOX V72 PLTR

TV80LIB DD80 OUTPUT........... 12:46:34U 06/14

EDIT TEST

BOX V72 PLTR

TV80LIB DD80 OUTPUT........... 12:46:34U 06/14

S E C T I O N B

HYDROCARBONS

23-212-41---1
POLYETHYLENE

(H2-C-C-H2)N = (C2-H4)N

V0 = 1.09 CC/G

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN MM/MICROSEC, AND PRESSURE IN KILOBARS.

TABLE

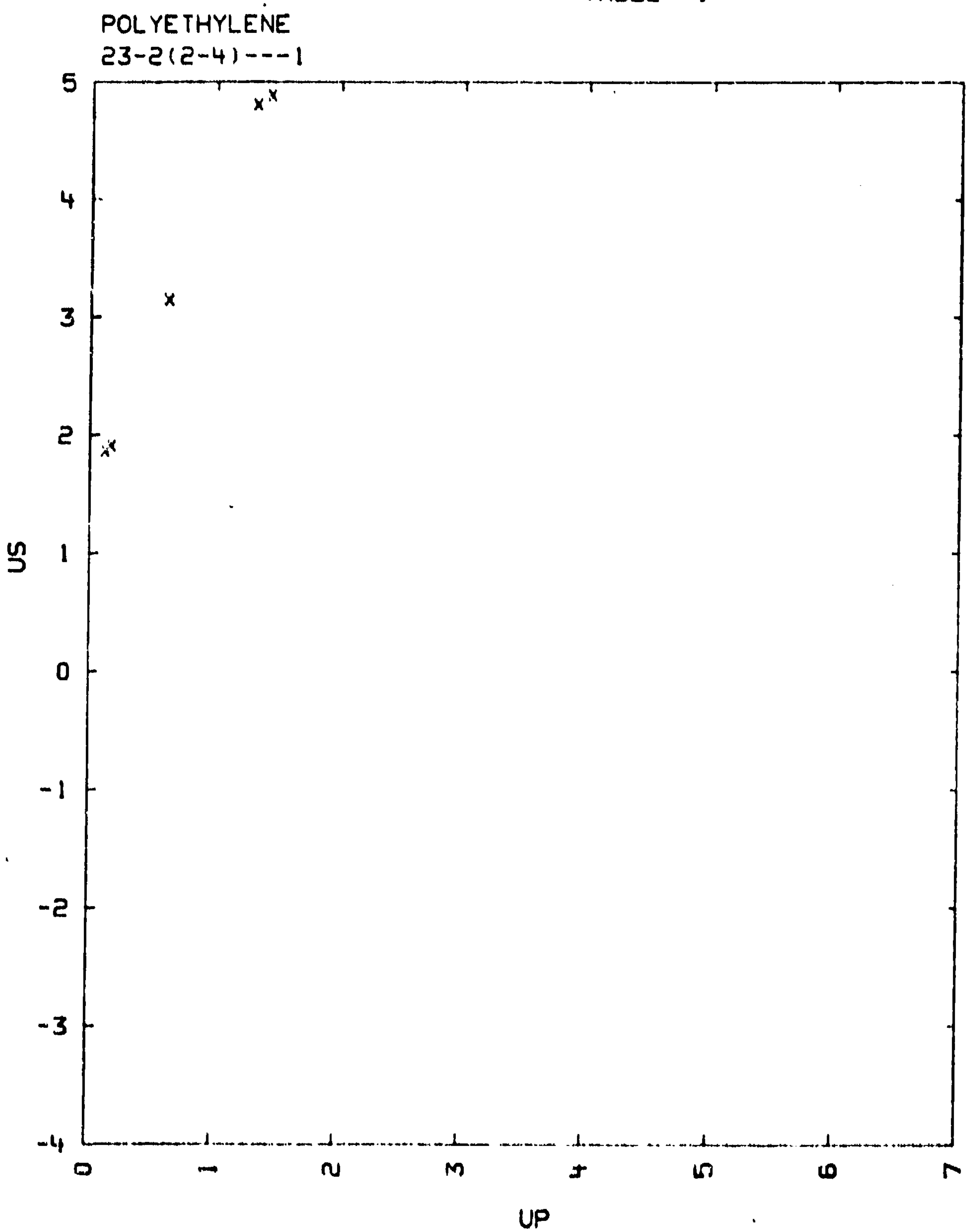
RHO0	US	UP	P	V/V0
.917	1.86	0.115	1.96	.9382
-	1.90	0.170	2.95	.9105
-	3.14	0.625	18.1	.8010
-	4.80	1.33	58.8	.723
-	4.88	1.44	64.5	.705

US = 1.57 + 2.37 UP KM/SEC, SIG.US = 0.1 KM/SEC.

COMMENTS:

1) SOURCE: WAGNER, M. H., WALDORF, W. F. AND LOUIE, N. A.
REPORT NO. AFSWC-TDR-62-66, VOL. 1 (1962)
WORK DONE AT DOWNEY, CALIFORNIA.
2) EXPERIMENTAL TECHNIQUE A
DATA REDUCTION TECHNIQUE B
IN THE TABLE UP = (1/2)UFS.
3) ACCURACY IS LIMITED BECAUSE ASSEMBLY DIMENSIONS ALLOW RELATIVELY LARGE DEVIATIONS FROM ONE-DIMENSIONALITY.

TABLE I



23-212-41---2
POLYETHYLENE GAMMA-IRRADIATED

(H2-C-C-H2)N = (C2-H4)N

V0 = 1.082 TO 1.096 CC/G

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN KM/SEC., AND PRESSURE IN KILOBARS.

TABLE

RHO0	US	UP	P	V/V0
0.918	7.25	2.89	192.4	0.601
-	6.91	2.62	166.	0.621
-	6.32	2.29	132.9	0.638
-	6.05	2.11	117.	0.651
-	5.90	1.98	107.2	0.664
-	5.66	1.81	94.0	0.680
-	5.66	1.81	94.0	0.680
-	5.63	1.81	93.5	0.679
-	5.62	1.81	93.4	0.678
-	5.63	1.81	93.5	0.678
-	5.17	1.59	75.5	0.693
-	5.04	1.47	68.0	0.708
-	4.65	1.23	52.5	0.735
-	4.58	1.25	52.6	0.727
-	4.02	0.83	30.6	0.794
-	4.00	0.80	29.4	0.800
-	3.92	0.82	29.5	0.792
-	3.45	0.44	13.9	0.872
-	3.44	0.44	13.9	0.872

US = 2.704 + 1.594*UP KM/SEC.
SIG US = 0.055 KM/SEC.

COMMENTS:

1) SOURCE: HAUVER, G. E.
TECHNICAL NOTE NO. 1628 (1966)
PRIVATE COMMUNICATION JAN. 1969
BALLISTIC RESEARCH LABORATORIES, ABERDEEN PROVING GROUND, MARYLAND.
2) EXPERIMENTAL TECHNIQUE H.
DATA REDUCTION TECHNIQUE B.
STANDARD MATERIAL ALUMINUM 2024 ALLOY,
AND PLEXIGLASS: US = 2.702 + 1.544*UP KM/SEC.
RHO0 = 1.18 G/CC.
3) THE SAMPLES WERE 3.18 MM THICK AND 12.70-MM IN DIAMETER. THE SURFACES WERE FLAT AND PARALLEL TO WITHIN A SIGMA OF 0.002 MM.
4) THE SAMPLES WERE IRRADIATED WITH A COBALT-60 GAMMA SOURCE. THE

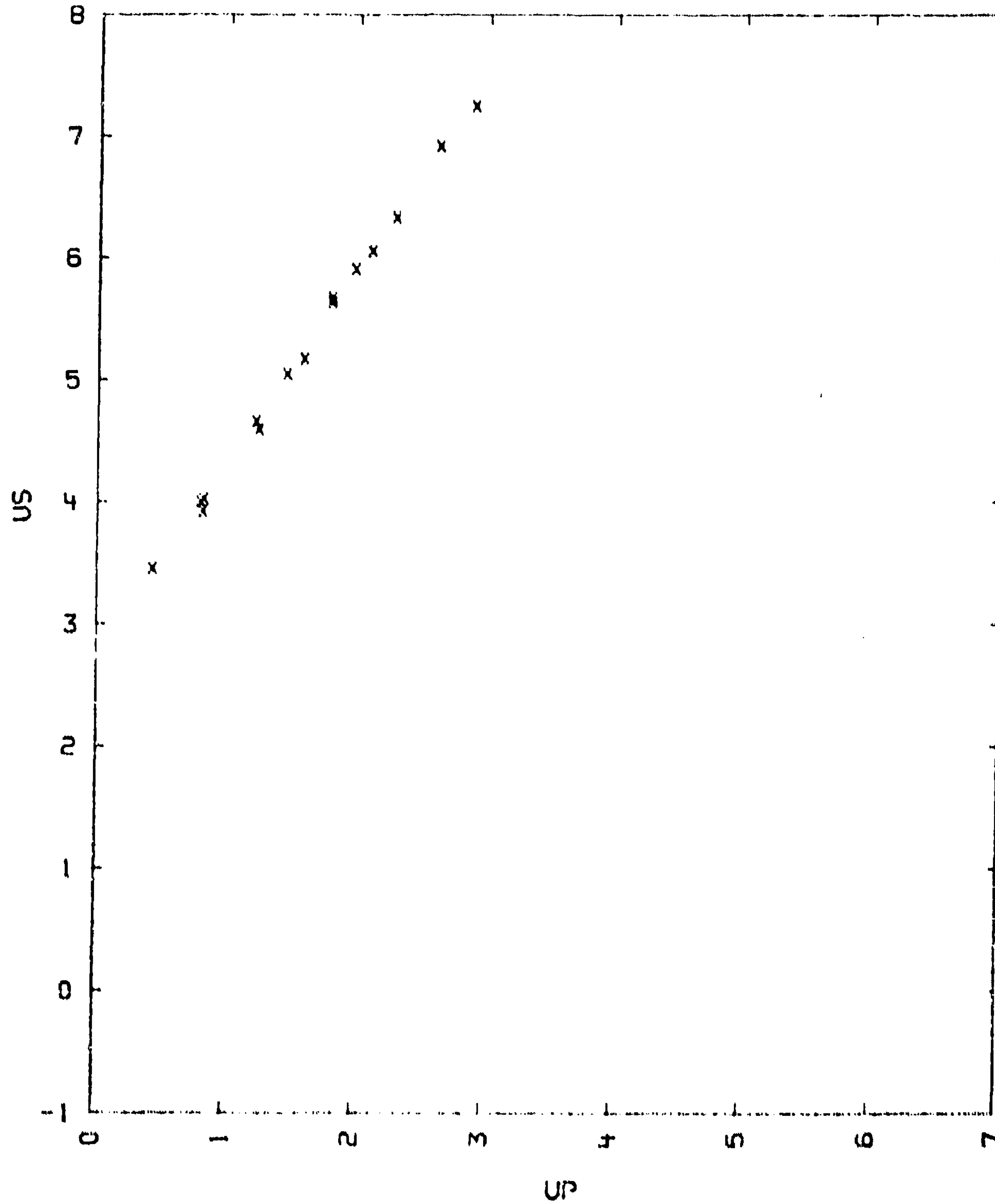
SAMPLES RECEIVED DOSES THAT RANGED FROM 0-2.0(10**8) RADS. IT WAS CONCLUDED THAT THE RADIATION DOSES USED DID NOT PRODUCE ANY MEASURABLE CHANGE IN THE HUGONIOT.

5) SAMPLES OF PLEXIGLASS AND POLYETHYLENE WERE PLACED ON A 2024 ALUMINUM PLATE. THE AL RELEASE CURVE WAS TAKEN TO BE A MIRROR IMAGE OF THE HUGONIOT: RICE ET. AL., SOLID STATE PHYSICS, VOL 6 (ACADEMIC PRESS, NEW YORK, 1958) PAGE 1FF. THE PLEXIGLAS HUGONIOT POINT ESTABLISHED THE POSITION OF THE CROSS CURVE.
INTERMEDIATE PRESSURES WERE OBTAINED BY PLACING DISKS OF 238 BRASS MO AND W DISKS BETWEEN THE POLYETHYLENE SAMPLES AND THE AL PLATE. ALL CROSS CURVES WERE REFLECTED HUGONIOTS.

TABLE I

POLYETHYLENE GAMMA-IRRADIATED

23-2(2-4)---2



23-212-41---3
POLYETHYLENE (ALATHON 7050)

(H2-C-C-H2)N = (C2-H4)N

V0 = 1.04 CC/G

THE TABLE LISTS DENSITY IN G/CC, VELOCITIES IN KM/SEC, AND PRESSURE IN KBAR.

TABLE

RHO0	US	UP	P	V/V0
0.96	7.09	2.55	174.	0.640
-	5.81	1.80	100.	0.690
-	5.05	1.24	60.1	0.754
-	4.31	0.79	32.7	0.817
-	3.74	0.44	15.8	0.882

US = 3.06 + 1.57*UP KM/SEC.
SIG US = 0.053 KM/SEC.

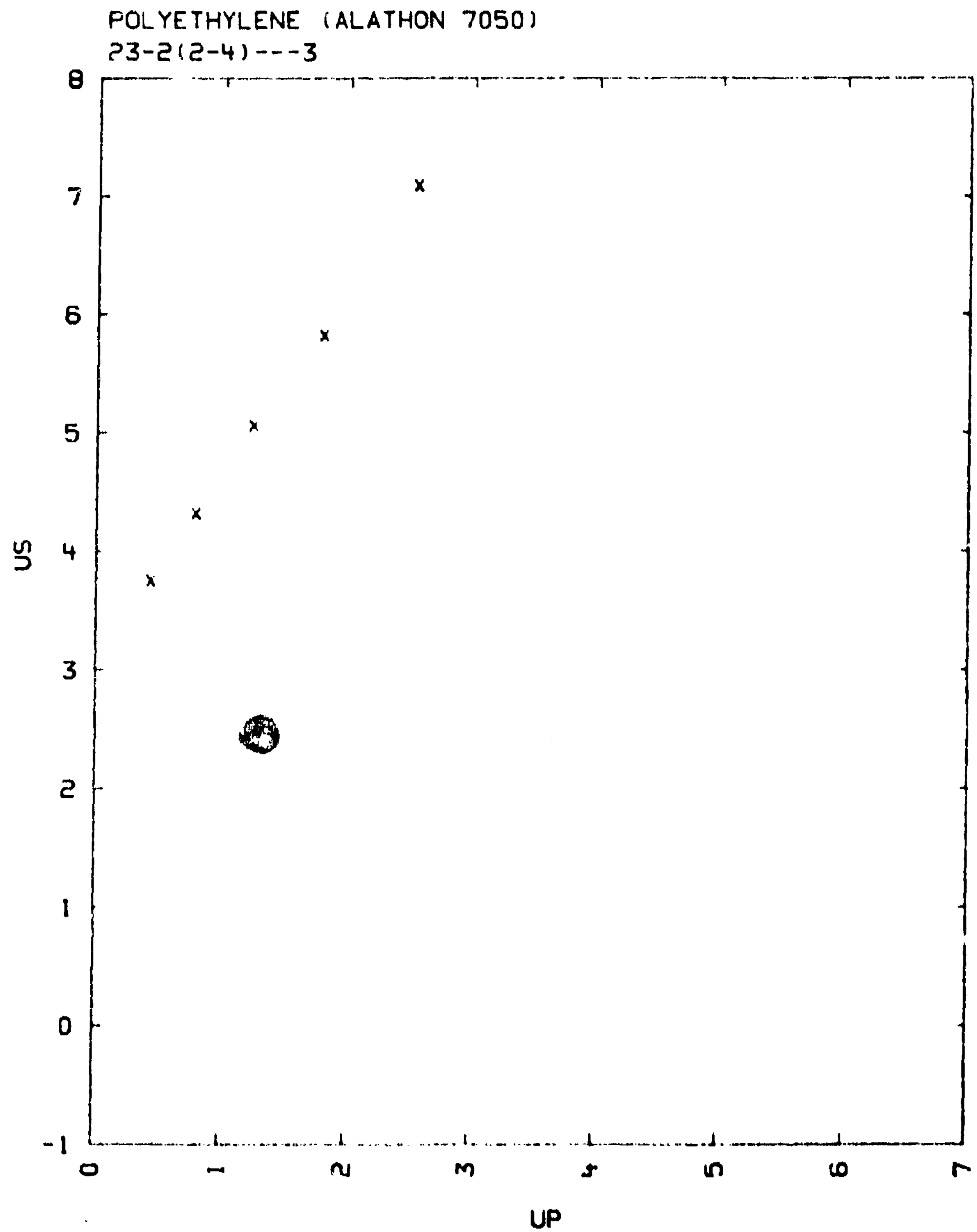
COMMENTS:

1) SOURCE: HAUVER, G. E. AND MELANI, A.,
PRIVATE COMMUNICATION, JAN 1969
BALLISTICS RES. LAB., ABERDEEN PROVING GROUNDS
MARYLAND, USA.

2) EXPERIMENTAL TECHNIQUE: H
DATA REDUCTION TECHNIQUE: B
STANDARD MATERIAL: PLEXIGLAS
US=2.02+1.544*UP KM/SEC, RHO0=1.18 G/CC.

3) THE SAMPLES AND STANDARD ARE PLACED ON AN ALUMINUM PLATE. THE RELEASE CURVE OF THE AL PLATE WAS DETERMINED FROM THE PLEXIGLAS SHOCK VELOCITY.

TABLE I


POLYETHYLENE (ALATHON 7050)
23-2(2-4)---3
US
UP
8
7
6
5
4
3
2
1
0
-1
0
1
2
3
4
5
6
7

23-2(2-4)---4
POLYETHYLENE

(H2-C-C-H2)N = (C2-H4)N

V0 = 1.066 CC/G

THE TABLE LISTS STRESS IN KBAR., VELOCITIES IN KM/SEC. AND DENSITY IN G/CC. N. IS THE NUMBER OF EXPERIMENTS THAT DETERMIN THE POINT. MAT IS THE PROJECTILE MATERIAL AND U ITS VELOCITY BEFORE IMPACT. POLY = POLY-ETHYLENE.

TABLE

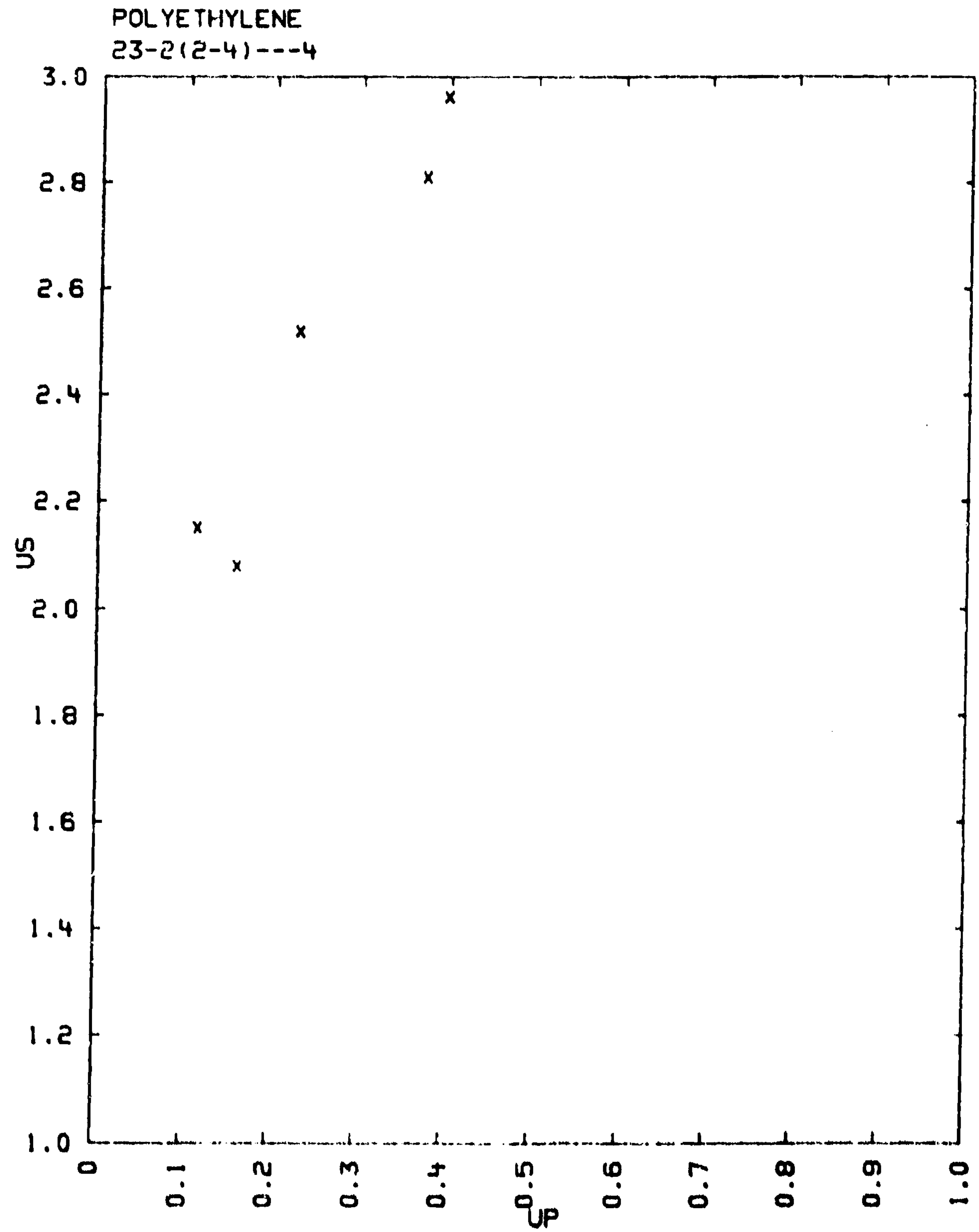
- - - - - - - -	SAMPLE	- - - - - - - -			STANDARD	
N	RHO0	US	UP	P	V/V0	U	MAT
1	0.938	2.96	0.396	11.0	0.866	0.749	POLY
1	-	2.81	0.373	9.85	0.867	0.722	-
1	-	2.52	0.230	5.44	0.9087	0.282	AL
4	-	2.08	0.161	3.15	0.9224	0.306	POLY
1	-	2.15	0.115	2.32	0.9465	0.260	-

US = 1.74 + 3.01*UP KM/SEC.
SIG.US = 0.11 KM/SEC.

COMMENTS:

1) SOURCE: ANDERSON G. D., MURRI W. J., ALVERSON R. C., HANAGUD S. V.
TECHNICAL REPORT AFWL-TR-67-24
STANFORD RES. INST., MENLO PARK, CALIF., U.S.A.
2) EXPERIMENTAL TECHNIQUE: 11 AND A
DATA REDUCTION TECHNIQUE: C
3) THE UNCERTAINTY IN P MAY BE ESTIMATED TO BE ABOUT PLUS OR MINUS 5 PERCENT FROM THE 4 EXPERIMENTS (7 POINTS) DETERMINING THE 4TH TABLE ENTRY. THE MAXIMUM UNCERTAINTY IN US IS ABOUT 10 PERCENT
4) THE WAVES SHOWED A BROAD SHOCK FRONT WITH AN INITIAL STRESS INCREASE TO 0.8P IN ABOUT 0.03 MICROSECONDS FOLLOWED BY A SLOWER RISE TO THE MAXIMUM STRESS LISTED IN THE TABLE. THE VALUES OF UP AND V/V0 CALCULATED FROM THE RANKINE HUGONIOT CONDITIONS FOR A SINGLE STRESS STEP ARE THEREFORE ONLY NOMINAL VALUES.

TABLE I



POLYETHYLENE
23-2(2-4)---4
US
UP
3.0
2.8
2.6
2.4
2.2
2.0
1.8
1.6
1.4
1.2
1.0
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0

23-212-4)---5
PARAFFIN

H3-C-(C(H2))N-C-H3

VO = 1.09 - 1.11 CC/G

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN KM/SEC, PRESSURE IN KILOBARS AND DENSITY IN G/CC.

TABLE

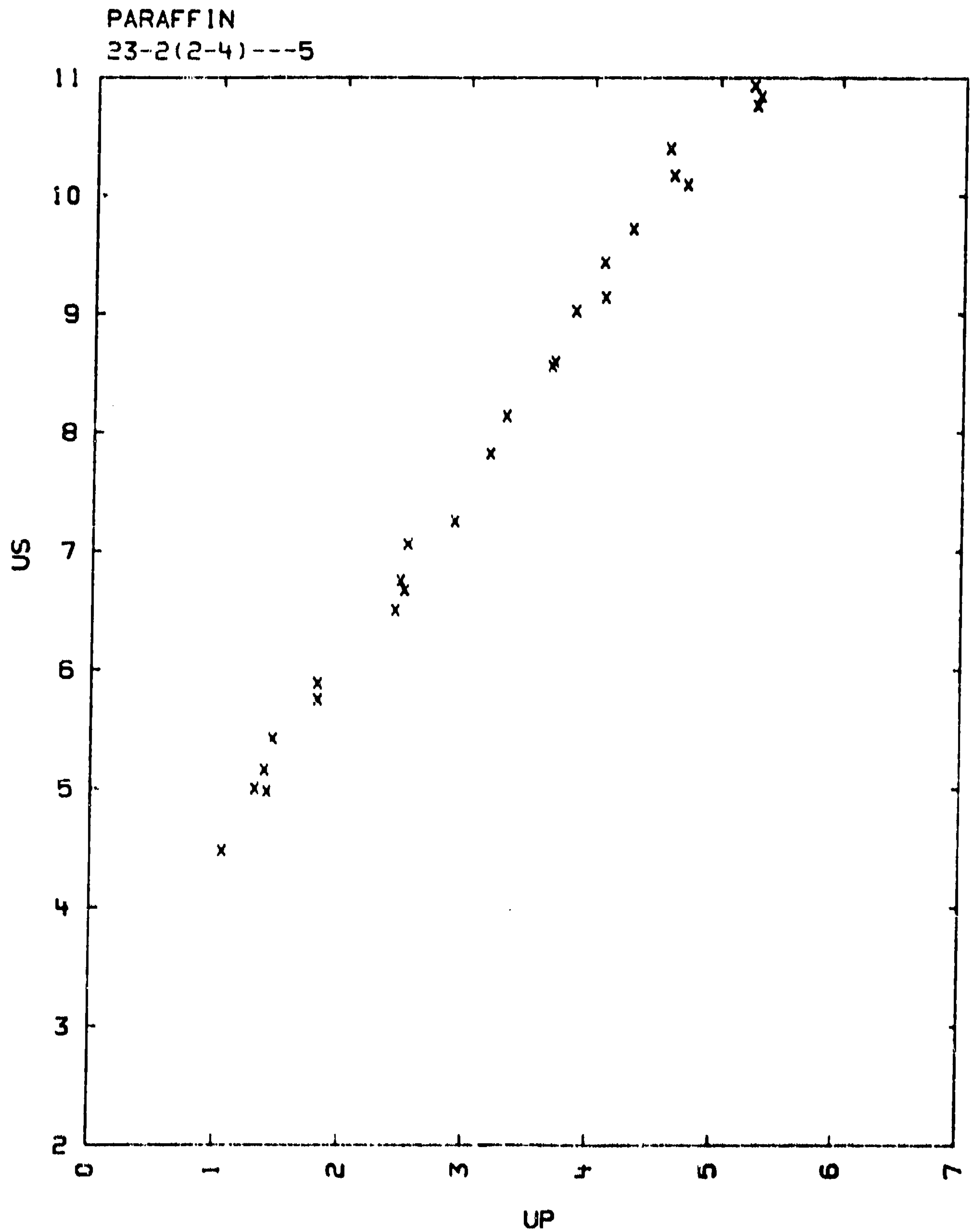
----------SAMPLE----------					-----STANDARD-----	
RHOO	US	UP	P	V/VO	MATERIAL	US(ST)
0.919	4.47	1.06	44.	0.7629	2024 AL	6.22
0.904	5.00	1.32	60.	0.7360	2024 AL	6.46
0.918	5.15	1.39	66.	0.7301	2024 AL	6.53
0.918	4.97	1.41	64.	0.7163	2024 AL	6.53
0.919	5.41	1.46	73.	0.7301	2024 AL	6.60
0.918	5.75	1.81	96.	0.6852	2024 AL	6.91
0.919	5.88	1.81	98.	0.6922	2024 AL	6.92
0.904	6.49	2.43	143.	0.6256	2024 AL	7.48
0.918	6.75	2.47	153.	0.6341	2024 AL	7.54
0.919	6.67	2.51	154.	0.6237	2024 AL	7.57
0.919	7.05	2.53	164.	0.6411	2024 AL	7.61
0.918	7.25	2.90	193.	0.6000	2024 AL	7.95
0.918	7.81	3.18	228.	0.5928	2024 AL	8.24
0.918	8.13	3.31	247.	0.5929	2024 AL	8.38
0.919	8.55	3.68	289.	0.5696	2024 AL	8.74
0.918	8.58	3.70	291.	0.5688	2024 AL	8.76
0.919	9.02	3.86	320.	0.5721	CU	7.30
0.918	9.43	4.08	353.	0.5673	2024 AL	9.16
0.919	9.13	4.10	344.	0.5509	2024 AL	9.16
0.919	9.71	4.31	385.	0.5561	2024 AL	9.39
0.919	10.39	4.60	439.	0.5573	CU	8.00
0.919	10.17	4.63	433.	0.5447	2024 AL	9.72
0.919	10.09	4.74	440.	0.5302	CU	8.13
0.918	10.93	5.28	530.	0.5168	2024 AL	10.35
0.919	10.76	5.30	524.	0.5074	2024 AL	10.36
0.919	10.83	5.33	530.	0.5078	2024 AL	10.39

US = 2.960 + 1.531*UP KM/SEC
SIGMA US = 0.173 KM/SEC

COMMENTS:

1) SOURCE: MCQUEEN, R.G., MARSH, S.P., TAYLOR, J.W., FRITZ, J.N., AND CARTER, W.J.
THE EQUATION OF STATE OF SOLIDS FROM SHOCK WAVE STUDIES, HIGH VELOCITY IMPACT PHENOMENA, KINSLOW (ED.) (ACADEMIC PRESS, NEW YORK, 1970) CHAPTER VII
2) EXPERIMENTAL TECHNIQUE : B

TABLE I



23-2(2-4)---6
POLYETHYLENE

(C2-H4)N

VO = 1.095 CC/G CL = 2.04 KM/SEC CO = 1.88 KM/SEC
CS = 0.66 KM/SEC
VO = 1.034 CC/G CO = 2.22 KM/SEC

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN KM/SEC, PRESSURE IN KILOBARS AND DENSITY IN G/CC.

TABLE

----SAMPLE----						-----STANDARD-----	
RHOO	US	UP	UFS	P	V/VO	MATERIAL	US(ST)
0.913	4.70	1.17		50.	0.751	2024 AL	6.32
0.920	4.98	1.40		64.	0.719	2024 AL	6.53
0.916	5.01	1.48	2.805	68.	0.705	921-T AL	6.40
0.916	5.01	1.49	-	68.	0.703	921-T AL	6.40
0.913	5.43	1.72		85.	0.683	2024 AL	6.81
0.916	5.60	1.77		91.	0.684	2024 AL	6.87
0.916	5.63	1.83	3.562	94.	0.675	921-T AL	6.74
0.916	5.57	1.83	-	93.	0.671	921-T AL	6.74
0.913	6.17	2.23		126.	0.639	2024 AL	7.29
0.909	6.15	2.35		131.	0.618	2024 AL	7.40
0.913	6.49	2.41		143.	0.629	2024 AL	7.47
0.916	6.54	2.44		146.	0.627	2024 AL	7.50
0.916	6.58	2.46	4.821	148.	0.626	921-T AL	7.38
0.916	6.58	2.46		148.	0.626	921-T AL	7.38
0.916	6.67	2.49	4.906	152.	0.627	921-T AL	7.41
0.916	6.64	2.50	-	152.	0.623	921-T AL	7.41
0.916	6.63	2.52	4.960	153.	0.620	921-T AL	7.44
0.916	7.47	3.04		208.	0.593	2024 AL	8.09
0.916	7.56	3.08	6.200	213.	0.593	921-T AL	8.02
0.916	7.51	3.09	-	213.	0.588	921-T AL	8.02
0.916	8.42	3.66		282.	0.565	2024 AL	8.71
0.916	8.41	3.77		290.	0.552	2024 AL	8.79
0.916	9.07	4.11	8.352	341.	0.547	921-T AL	9.11
0.916	9.04	4.12	-	341.	0.544	921-T AL	9.11
0.916	9.03	4.14		342.	0.541	2024 AL	9.17
0.916	8.98	4.15		341.	0.538	2024 AL	9.18
0.916	9.55	4.[illegible]1		395.	0.528	2024 AL	9.55
0.916	9.57	4.53		397.	0.527	2024 AL	9.58
0.916	9.97	4.83		441.	0.515	2024 AL	9.86

US = 2.901 + 1.481*UP KM/SEC
SIGMA US = 0.074 KM/SEC

COMMENTS:

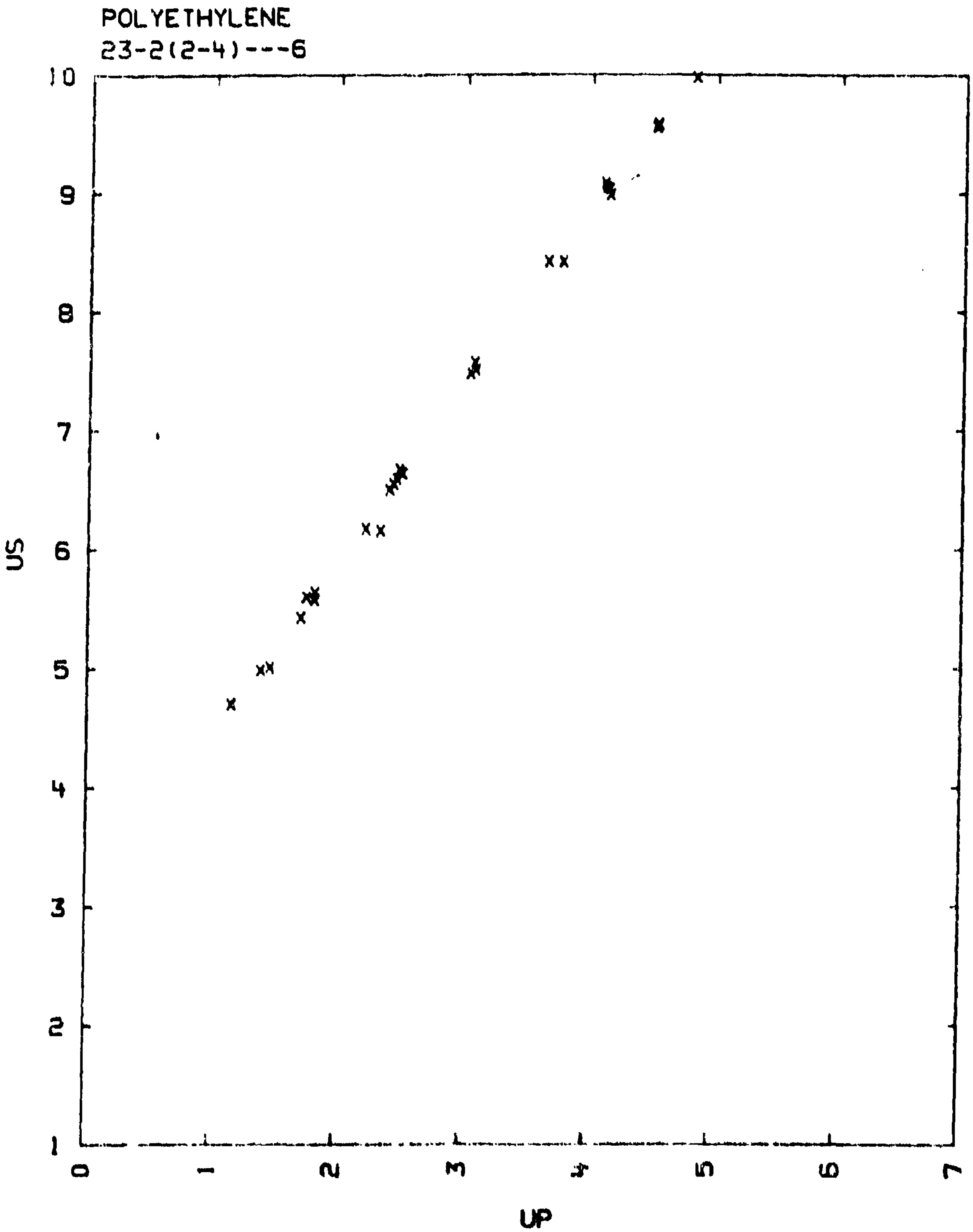
1) SOURCE: MCQUEEN, R.G., MARSH, S.P., TAYLOR, J.W., FRITZ, J.M.,
AND CARTER, W.J.
THE EQUATION OF STATE OF SOLIDS FROM SHOCK WAVE STUDIES,
HIGH VELOCITY IMPACT PHENOMENA, KINSLOW (ED.) (ACADEMIC
PRESS, NEW YORK, 1970) CHAPTER VII

2) EXPERIMENTAL TECHNIQUE: B
DATA REDUCTION TECHNIQUE: B (STANDARD BASE PLATE AS SHOWN)

3) THE SMALL VALUES OF UFS INDICATE THAT THE SHOCKED SAMPLES DECOMPRESS
TO A DENSITY LARGER THAN RHOO.

4) V(DP/DE) = 1.64

TABLE I



23-2(6-6)---1
BENZENE

C6-H6 99. WT. PERCENT

TO = 12 TO 30 DEG. C CO(22 DEG. C.) = 1.31 KM/SEC.
VO = 1.127 TO 1.152 CC/G

THE TABLE LISTS TEMPERATURE IN DEG. C., VELOCITIES IN KM/SEC., DENSITY IN G/CC. AND PRESSURE IN KBAR. DUS AND DUP ARE THE UNCERTAINTIES IN US AND UP

TABLE

- - - -	- -	- -	- SAMPLE	- -	- -	- -	- -	- STANDARD	-
T	RHOO	US	DUS	UP	DUP	P	V/VO	US(ST)	DUS(ST)
22	0.877	2.78	0.01	0.61	0.09	15.	0.779	5.93	0.07
29	0.869	2.72	0.01	0.73	0.04	17.	0.730	6.02	0.03
28	0.870	2.96	0.02	0.73	0.05	19.	0.753	6.02	0.04
28	0.870	3.31	0.01	0.90	0.03	26.	0.730	6.16	0.04
24	0.875	3.44	0.01	0.97	0.03	29.	0.719	6.22	0.03
20	0.879	3.47	0.01	0.98	0.04	30.	0.719	6.23	0.03
19	0.880	3.85	0.01	1.22	0.03	41.	0.684	6.43	0.02
32	0.866	3.89	0.01	1.31	0.02	44.	0.663	6.50	0.02
14	0.885	4.05	0.01	1.31	0.03	47.	0.676	6.52	0.02
22	0.877	4.05	0.01	1.34	0.03	47.	0.669	6.54	0.02
18	0.881	4.09	0.01	1.45	0.09	52.	0.646	6.62	0.07
29	0.869	4.38	0.01	1.63	0.03	62.	0.627	6.78	0.02
29	0.869	4.52	0.01	1.72	0.01	67.	0.620	6.86	0.01
14	0.885	4.79	0.02	1.78	0.05	75.	0.630	6.92	0.04
27	0.871	4.77	0.02	1.81	0.02	75.	0.620	6.95	0.02
28	0.870	5.00	0.02	2.04	0.10	89.	0.591	7.14	0.08
28	0.870	5.28	0.01	2.17	0.02	99.	0.589	7.26	0.01
24	0.875	5.64	0.01	2.21	0.02	106.	0.596	7.31	0.02
19	0.880	5.52	0.02	2.26	0.04	110.	0.591	7.35	0.03
30	0.868	5.71	0.01	2.50	0.03	124.	0.562	7.56	0.03
12	0.887	6.00	0.03	2.75	0.03	147.	0.541	7.80	0.03
27	0.871	5.93	0.02	2.82	0.02	145.	0.525	4.83	0.02
23	0.876	6.17	0.02	3.24	0.08	175.	0.475	8.20	0.06
28	0.870	6.22	0.04	3.35	0.06	181.	0.462	8.20	0.05
28	0.870	6.43	0.03	3.57	0.03	200.	0.445	8.48	0.03
25	0.874	6.82	0.06	3.83	0.09	229.	0.438	8.74	0.08
19	0.881	7.23	0.01	4.06	0.04	259.	0.438	8.97	0.04
26	0.872	7.16	0.03	4.12	0.08	257.	0.422	9.00	0.06
27	0.871	7.25	0.03	4.20	0.09	267.	0.420	9.08	0.08
24	0.875	7.66	0.05	4.53	0.06	304.	0.408	9.39	0.05
23	0.876	8.24	0.05	4.92	0.07	356.	0.403	9.77	0.06
23	0.876	8.61	0.04	5.15	0.07	389.	0.402	10.00	0.06
18	0.881	8.91	0.07	5.32	0.15	418.	0.403	10.17	0.12
27	0.871	8.82	0.08	5.36	0.12	412.	0.393	10.18	0.10
25	0.874	8.97	0.08	5.45	0.11	427.	0.392	10.28	0.09

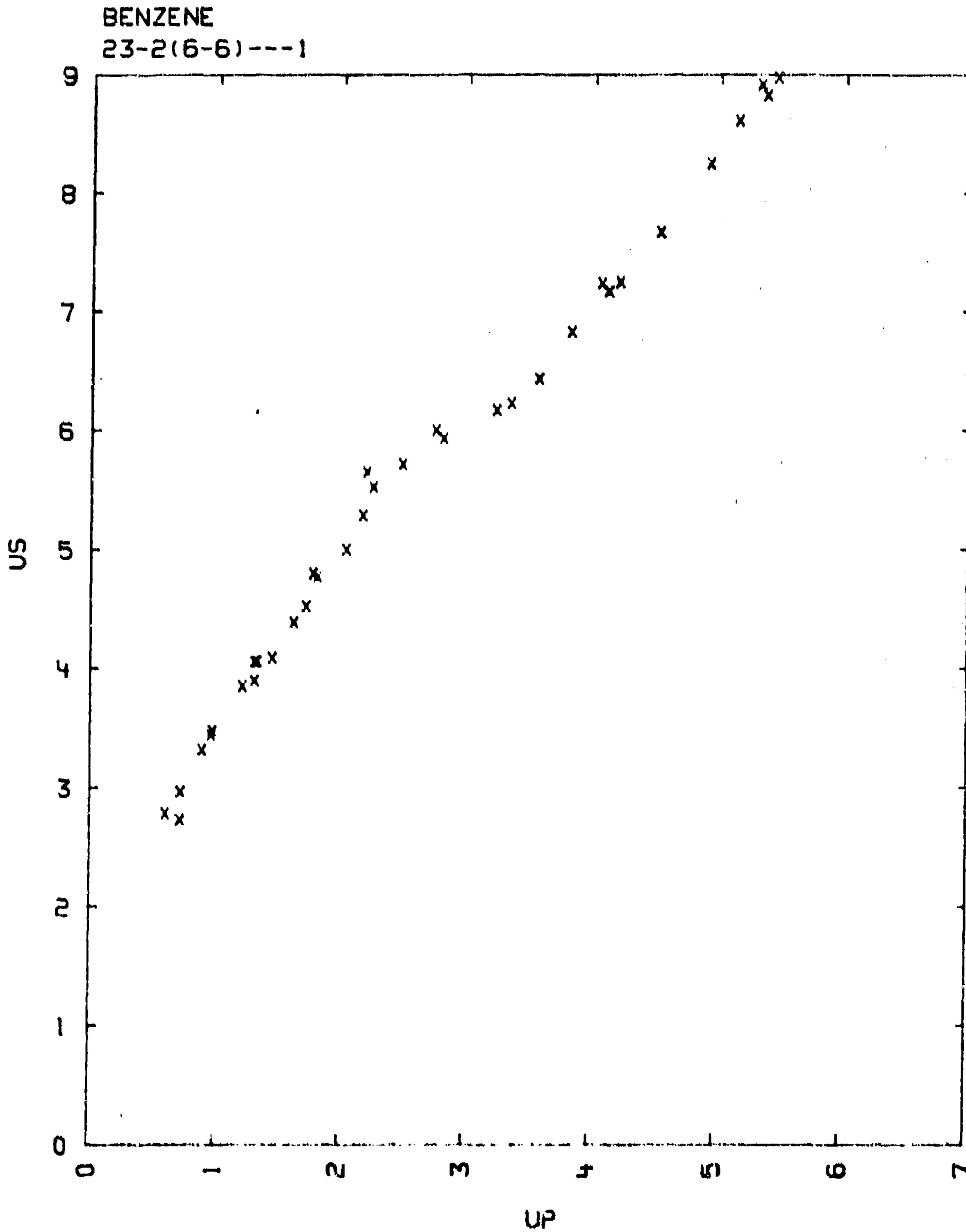
US = A + B*UP WITH A = 1.98 KM/SEC., B = 1.58
SIG.A = 0.05 KM/SEC., SIG.B = 0.03
FOR UP BETWEEN 0.3 AND 2.5 KM/SEC AND

A = 1.68 KM/SEC., B = 1.34
SIG.A = 0.12 KM/SEC SIG.B = 0.03
FOR UP BETWEEN 3.4 AND 5.5 KM/SEC

COMMENTS:

1) SOURCE: DICK R. D.
REPORT: LA-3915, APRIL 1968 (THESIS)
LOS ALAMOS SCIENTIFIC LAB.
LOS ALAMOS, BOX 1663, NEW MEXICO 87544
2) EXPERIMENTAL TECHNIQUE: A
DATA REDUCTION TECHNIQUE: B STANDARD MATERIAL 2024 AL ALLOY WITH
US = 5.460 + 1.318*UP RHO0 = 2.785G/CC
AND GRUNEISEN GAMMA = 2.22

TABLE I



23-2(6-6)---2
BENZENE

C6H6

TO = 16-32 DEG. CENTIGRADE
VO = 1.133-1.155 CC/G   CO = 1.35-1.28 KM/SEC.

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN KM/SEC., PRESSURE IN KILOBARS, DENSITY IN G/CC. AND TEMPERATURE IN DEG. CENTIGRADE.

TABLE

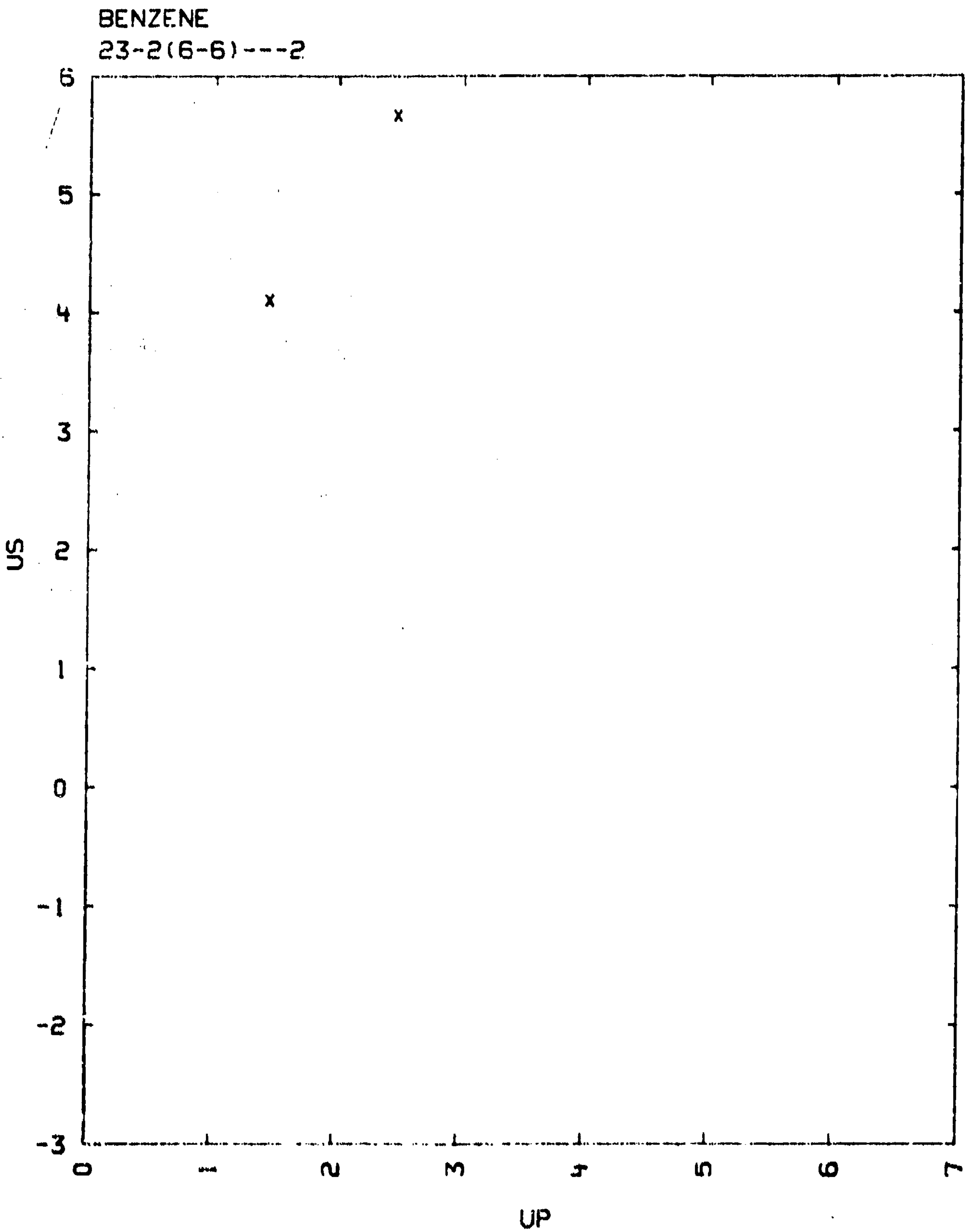
TO	RHOO	US	UP	P	V/VO
32	0.8658	5.66	2.470	121.0	0.564
16	0.8826	4.10	1.448	52.4	0.647

US = 1.89 + 1.53*UP KM/SEC

COMMENTS:

1) SOURCE: WALSH J. M. AND RICE M. H.
   JOURNAL OF CHEMICAL PHYSICS, VOL. 26, P. 815 (1957)
2) EXPERIMENTAL TECHNIQUE B
   DATA REDUCTION TECHNIQUE B
   STANDARD MATERIAL 24ST ALUMINUM
3) THE VALUES FOR CO WERE DETERMINED BY INTERPOLATING THE DATA POINTS OBTAINED FROM THE AMERICAN INSTITUTE OF PHYSICS HANDBOOK, (MCGRAW-HILL BOOK CO., N. Y. 1963) 2ND ED.

TABLE I



23-2?5-141---1
HEXANE

C6-H14

TO = 19-32 DEG. CENTIGRADE
VO = 1.471-1.489 CC/G.

CO = 1.083 KM/SEC.
AT 20 DEG. CENTIGRADE

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN KM/SEC., PRESSURE IN KILOBARS, DENSITY IN G/CC AND TEMPERATURE IN DEG. CENTIGRADE.

TABLE

TO	RHOO	US	UP	P	V/VO
32	0.6671	5.54	2.590	95.7	0.533
19	0.6798	4.02	1.517	41.5	0.622

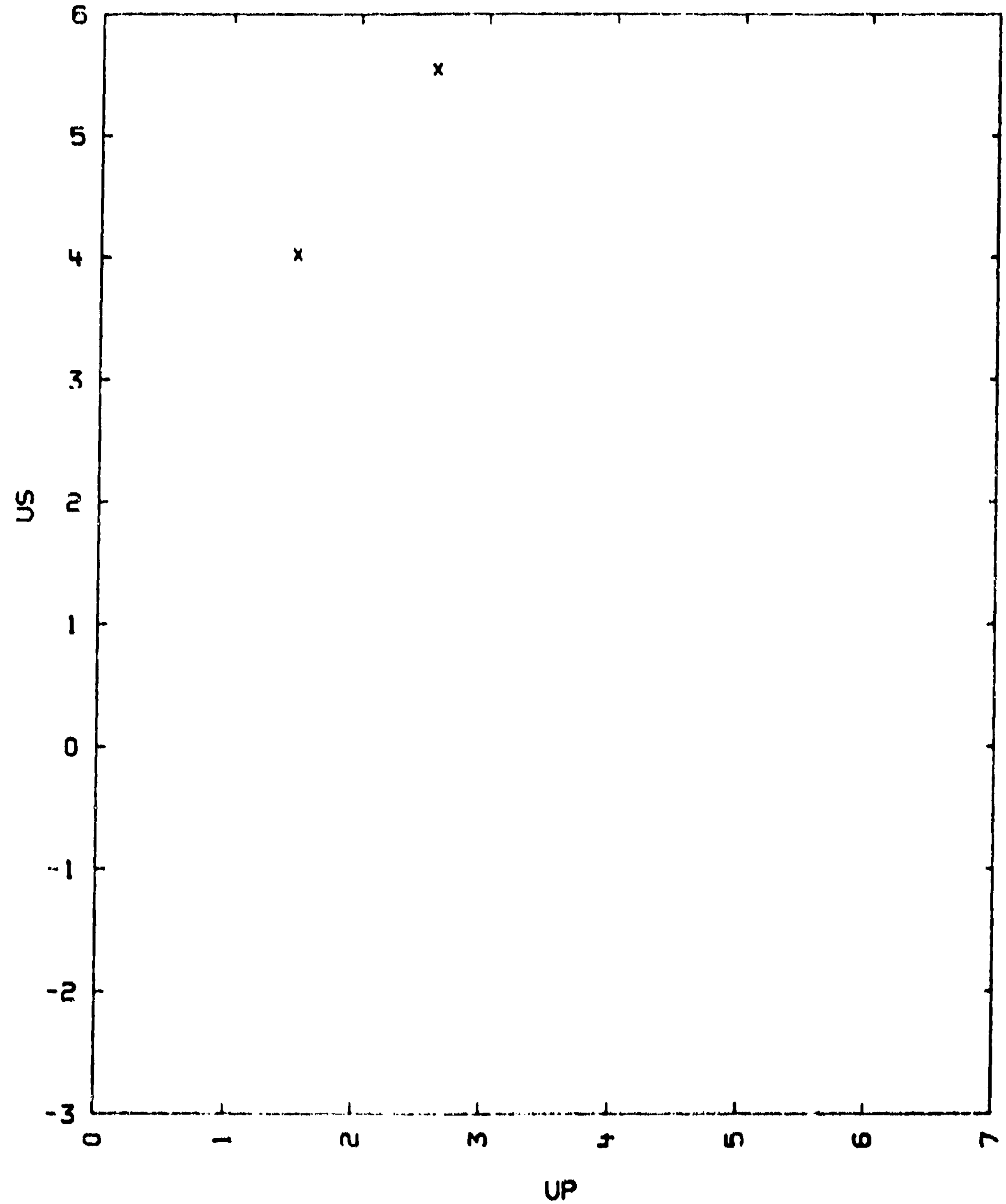
US = 1.07 + 1.42*UP KM/SEC

COMMENTS:

1) SOURCE: WALSH J. M. AND RICE M. H.
JOURNAL OF CHEMICAL PHYSICS, VOL. 26, P. 815 (1957)
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION TECHNIQUE B
STANDARD MATERIAL 24ST ALUMINUM
3) CO AT 20 DEG. CENTIGRADE WAS OBTAINED FROM THE AMERICAN INSTITUTE OF PHYSICS HANDBOOK, (MCGRAW-HILL BOOK CO., N. Y. 1963) 2ND ED.

TABLE I

HEXANE
23-2(6-14)---1



23-2(6-14)---2
HEXANE

C(H3)-(C(H2))4-C-(H3)

T0 =25-26 CO(20 DEG.C.)= 1.083 KM/SEC
V0I=1.525-1.527 CC/G.

THE TABLE LISTS T IN DEG C., RHO0 IN G/CC, VELOCITIES IN KM/SEC AND P IN KBARS. RI IS REFRACTIVE INDEX. AL IS 2024 ALUMINUM

TABLE

SAMPLE							DRIVER	
T0	RHO0	US	UP	P	V/V0	RI	UFS	MAT
25.	0.6558	4.17	1.52	41.5	0.635	1.643	1.77	AL
26.	0.6549	3.92	1.56	40.0	0.602	1.604	1.82	AL
20.	0.6603			0.0	1.00	1.375		

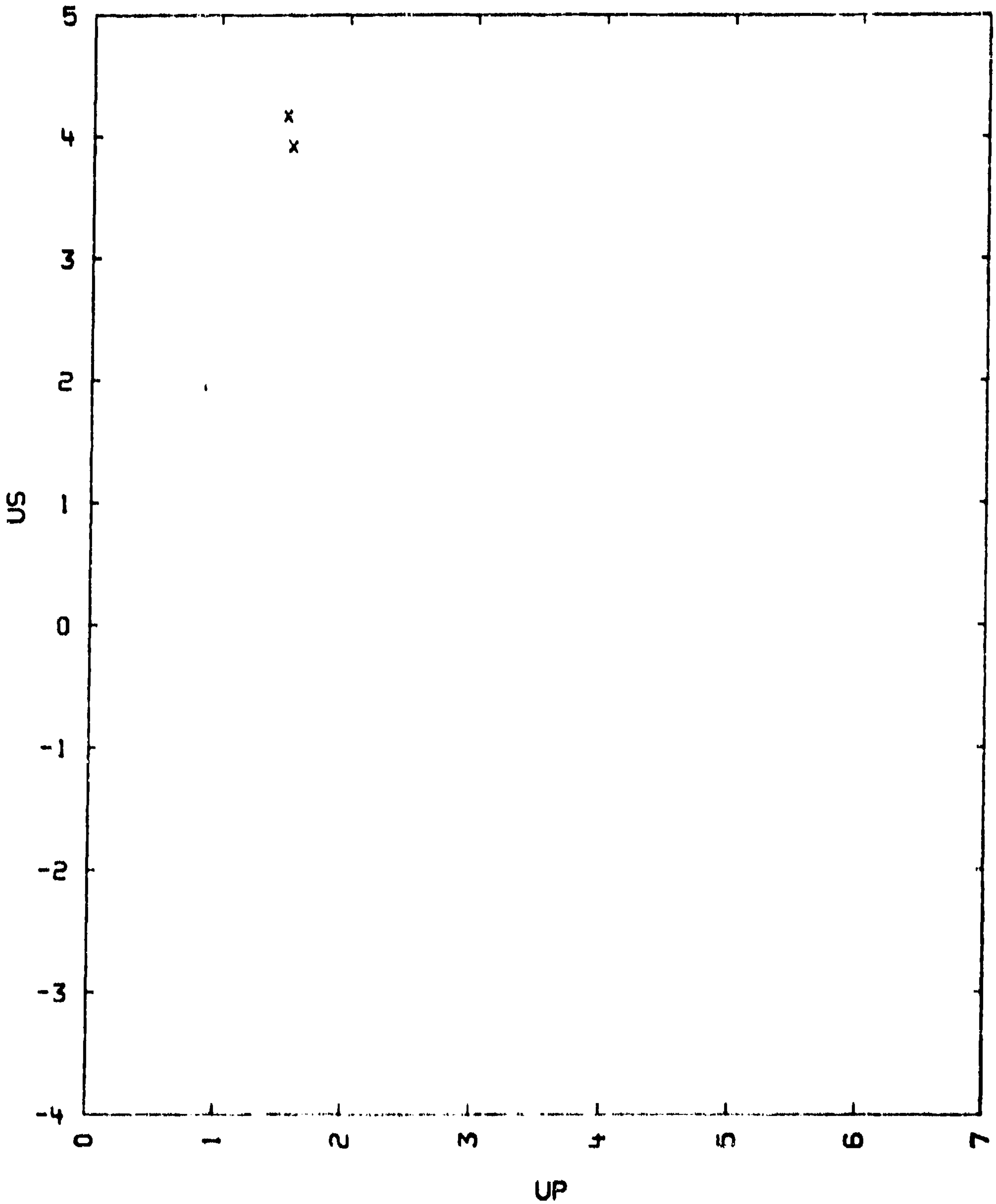
US =

COMMENTS:

1) SOURCE: AHRENS T.J. AND RUDERMAN M.H.
J. APPL. PHYS. V.37 P.4758 (1966)
2) EXPERIMENTAL TECHNIQUE: D AND CI
DATA REDUCTION METHOD : B
3) V0I AND RHO0 WHERE CALCULATED USING
RHO0(T)=0.6777 - .8486E 3*T - 1.084E-6*T**2 + .164E-9*T**3 G/CC
(LANDOLT BORNSTEIN, ZAHLWERTE UND FUNKTIONEN (SPRINGER VERLAG, N.Y. 1971) V.2 PART1 P.635 AND RHO0(20)=0.6603 TO ADJUST FIRST COEFF.
4) CO IS FROM L. BERGMAN, DER ULTRASCHALL (S. HIRZEL VERLAG, STUTTGART 1954)
5) UNCERTAINTIES IN US 1-1.5 PERCENT
UP 2.5 - MAXIMUM
RI 1.3 -
6) ISOTHERMAL COMPRESSIBILITY 159E-6 PER ATMOSPHERE (LANDOLT BORNSTEIN)

TABLE 1

HEXANE
23-2(6-14)---2



23-2(8-8)---1
POLYSTYRENE

(C6-H5-C(H)-CH2)N = (C8-H8)N

VO = 0.952 CC/G

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN MM/MICROSEC, AND PRESSURE IN KILOBARS.

TABLE

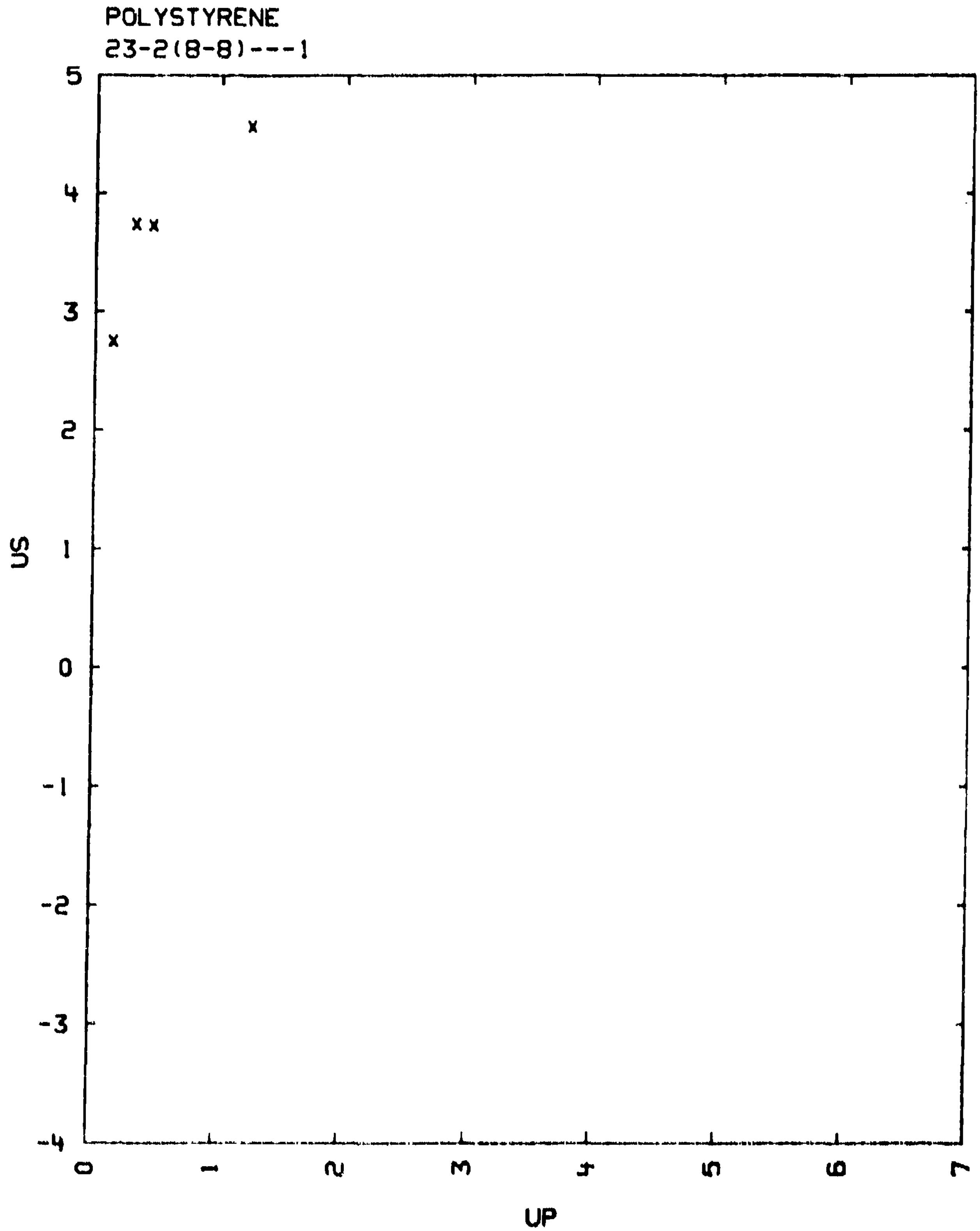
RHOO	US	UP	P	V/VO
1.05	2.74	.140	4.07	.9489
-	3.73	.320	12.5	.9142
-	3.72	.460	17.9	.8764
-	4.56	1.24	59.3	.7281

US = 2.82 + 1.60 UP MM/MICROSEC

COMMENTS:

1) SOURCE: WAGNER, M.H., WALDORF, W.F. AND LOUIE, N.A.
REPORT NO. AFSWC-TDR-62-66, VOL. I
WORK DONE AT DOWNEY, CALIFORNIA.
2) EXPERIMENTAL TECHNIQUE A
DATA REDUCTION TECHNIQUE D
IN THE TABLE UP = (1/2)UFS.
3) ACCURACY IS LIMITED BECAUSE ASSEMBLY DIMENSIONS ALLOW RELATIVELY LARGE DEVIATION FROM ONE-DIMENSIONALITY.

TABLE I



23-2(8-8)---2
POLYSTYRENE

(C6-H5)C(H)-C-H2)N = (C8-H8)N

VO = 0.952 CC/G

IN THE TABLE BELOW DENSITY IS GIVEN IN G/CC, VELOCITY IN KM/SEC AND PRESSURE IN KILOBARS

TABLE I

RHOO	US	UP	P	V/VO
1.05	3.91	0.92	37.7	0.765
-	5.26	1.73	95.5	0.671
-	5.35	1.81	102	0.662
-	5.85	2.15	132	0.632
-	6.12	2.29	147	0.626
-	6.37	2.38	159	0.626
-	6.46	2.48	168	0.616
-	6.75	2.75	195	0.592
-	6.87	3.00	216	0.563
-	7.15	3.32	249	0.536
-	7.17	3.39	255	0.527
-	7.26	3.49	266	0.519
-	7.28	3.40	260	0.533
-	7.31	3.45	265	0.528
-	7.31	3.52	270	0.518
-	7.34	3.46	267	0.529

US = 2.40 + 1.637 UP FROM UP = 0.9 TO 2.5 KM/SEC.
SIGMA US = 0.049 KM/SEC

TABLE II

RHOO	US	UP	P	V/VO
1.05	3.38	0.57	20.2	0.831
-	3.59	0.70	26.4	0.805
-	3.87	0.87	35.3	0.775
-	3.93	0.88	36.3	0.776
-	3.95	0.88	36.5	0.777
-	3.96	0.90	37.4	0.773
-	3.97	0.88	36.7	0.778
-	4.34	1.11	50.6	0.744
-	4.42	1.31	60.8	0.704
-	4.47	1.22	57.3	0.727
-	4.80	1.43	72.1	0.702

POLYSTYRENE

RHOO	US	UP	P	V/VO
-	5.09	1.46	78.0	0.713
-	5.16	1.62	87.8	0.686
-	5.69	2.01	120	0.647
-	5.72	1.98	119	0.654
-	5.80	2.05	125	0.646
-	5.82	2.05	125	0.648
-	6.03	2.13	135	0.647
-	6.16	2.23	144	0.638
-	6.24	2.28	149	0.635
-	6.36	2.40	160	0.623
-	6.58	2.48	171	0.623
-	6.73	2.92	206	0.566
-	6.87	3.01	217	0.562

US = 2.47 + 1.643 UP KM/SEC, FROM UP = 0.5 TO 2.5 KM/SEC
SIGMA US = 0.077 KM/SEC.

THE LEAST SQUARE FIT ON TABLE I AND II COMBINED YIELDS
US = 2.48 + 1.63 UP KM/SEC FROM UP = 0.5 TO 2.5 KM/SEC
SIGMA US = 0.08
US = 3.96 + 0.98 UP KM/SEC FROM UP = 2.7 TO 3.6 KM/SEC
SIGMA US = 0.044

COMMENTS:

1) SOURCE: HAUVER G. E. AND MELANI A.
B.R.L. REPORT NO. 1259 (1964)
BALLISTIC RES. LABS., ABERDEEN PROVING GROUNDS, MD.
2) EXPERIMENTAL TECHNIQUE B, C1 (TABLE I), H (TABLE II)
DATA REDUCTION METHOD 6
3) AN APPARENT DISCONTINUITY IN THE US VS. UP CURVE SUGGESTS A TRANSITION AT 180 KB WHICH IS SUPPORTED BY A RAPID CHANGE IN THE POLARIZATION SIGNAL ABOVE THIS PRESSURE.
4) ALL DATA CORRECTED FOR SHOCK WAVE TILT

TABLE I

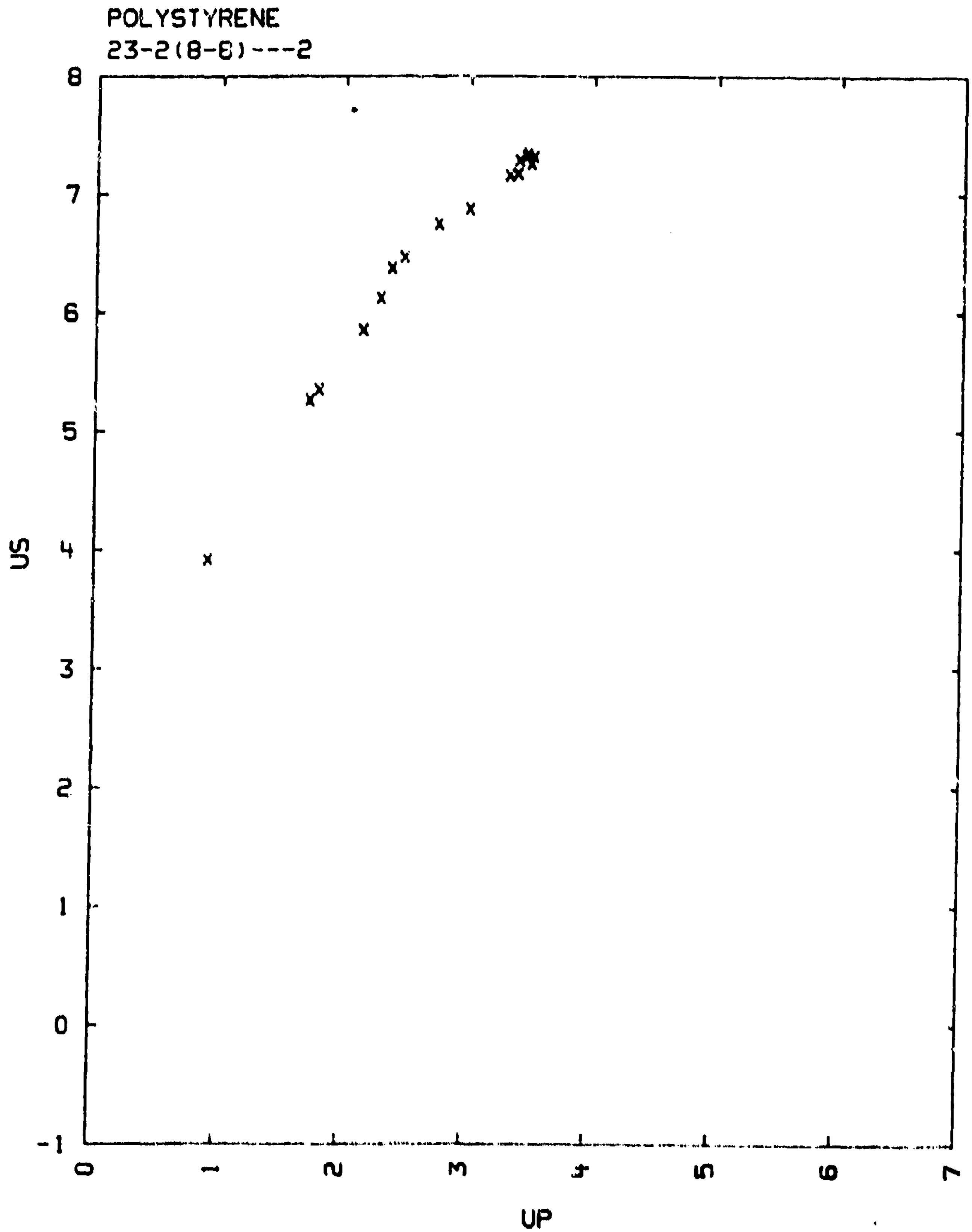
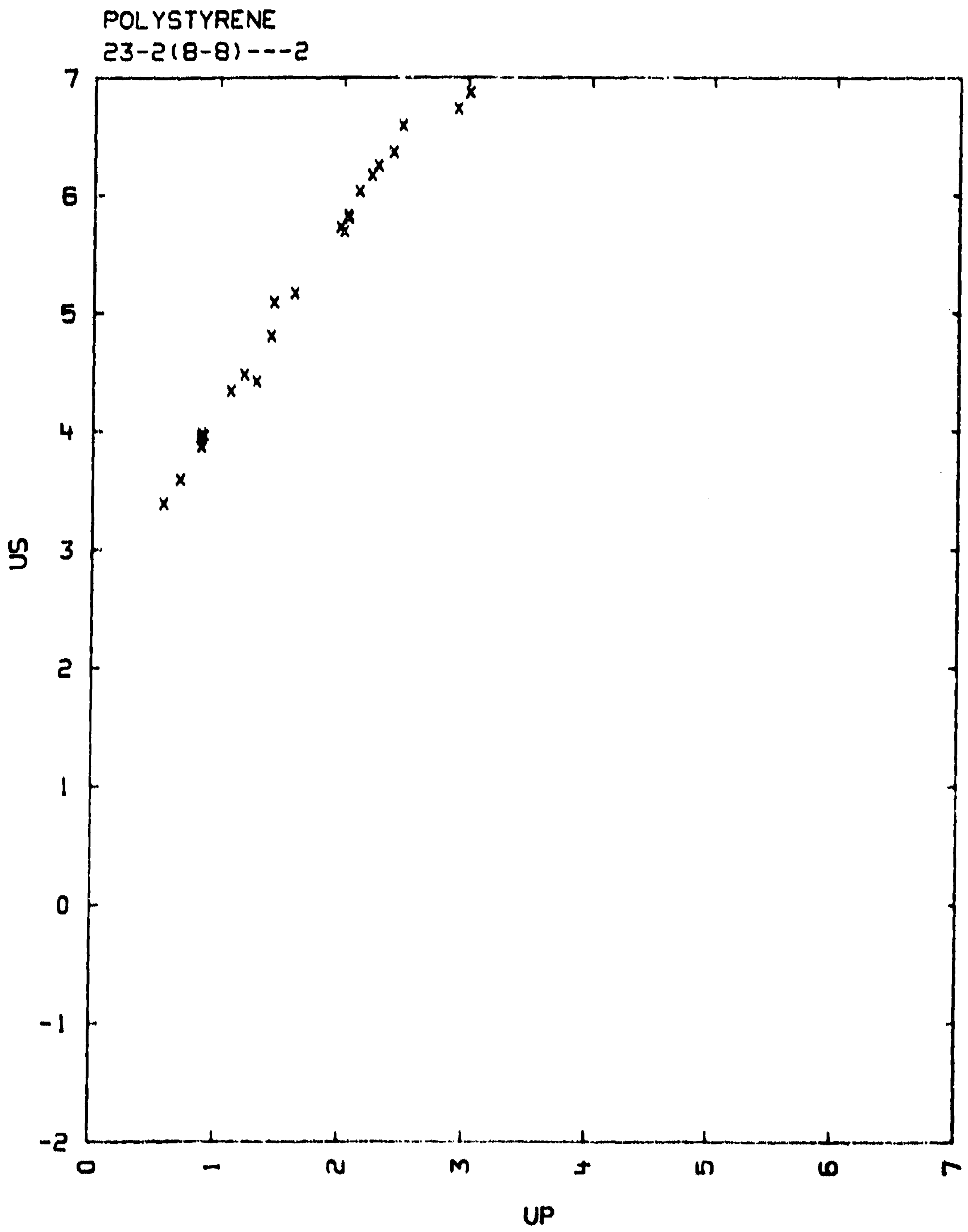


TABLE II



23-2(8-8)---3
POLYSTYRENE
(C6-H5-C(H)-CH2)N = (C8-H8)N

VO = 0.9542 CC/G.

IN THE TABLE BELOW, VELOCITIES ARE GIVEN IN KM/SEC., PRESSURE IN KILOBARS AND DENSITY IN G/CC.

TABLE

--------------SAMPLE--------------					------STANDARD--------	
RHO0	US	UP	P	V/VO	UFS (PLEXIGLASS)	UFS (ALUMINUM AUNG)
1.048	5.841	2.335	143.0	0.600	4.600	
-	6.038	2.310	146	0.617	4.600	
-	5.952	2.265	141	0.619	4.500	
-	6.082	2.330	148	0.617	4.660	
-	5.636	2.027	119	0.640	3.990	
-	5.592	2.020	118	0.639	3.960	
-	5.793	2.130	129	0.632	4.220	
-	5.793	2.165	132	0.626	4.280	
-	6.203	2.135	139	0.656	4.340	
-	6.038	2.125	134	0.648	4.280	
-	5.813	2.180	133	0.625	4.320	
-	5.875	2.140	132	0.636	4.260	
-	5.580	2.158	127	0.613		2.900
-	5.624	2.155	127	0.617		2.900
-	5.611	2.240	132	0.601		3.010
-	5.611	2.265	134	0.596		3.040
-	5.478	2.015	117	0.632		2.700
-	5.446	2.042	116	0.625		2.730
-	5.422	1.935	110	0.643		2.590
-	5.382	1.927	109.5	0.642		2.580
-	5.387	2.067	116	0.616		2.750
-	5.452	1.995	114	0.634		2.670
-	5.592	2.095	124	0.625		2.815
-	5.773	2.105	128	0.635		2.850
-	5.186	1.812	96	0.650		2.390
-	5.165	1.800	95	0.652		2.377
-	5.122	1.802	96.5	0.648		2.385
-	5.010	1.827	96	0.635		2.405
-	5.170	1.840	100	0.644		2.445
-	5.154	1.832	100	0.645		2.435
-	5.122	1.840	99.5	0.641		2.440
-	5.070	1.852	100	0.635		2.455
-	5.192	1.912	105	0.632		2.540
-	5.154	1.918	105	0.628		2.550
-	5.128	1.955	104	0.619		2.580
-	5.185	1.998	106	0.615		2.635
-	4.270	1.368	61	0.679		1.755
-	4.270	1.365	61	0.680		1.748
-	4.452	1.462	68	0.672		1.890
-	4.496	1.418	67	0.684		1.835

POLYSTYRENE

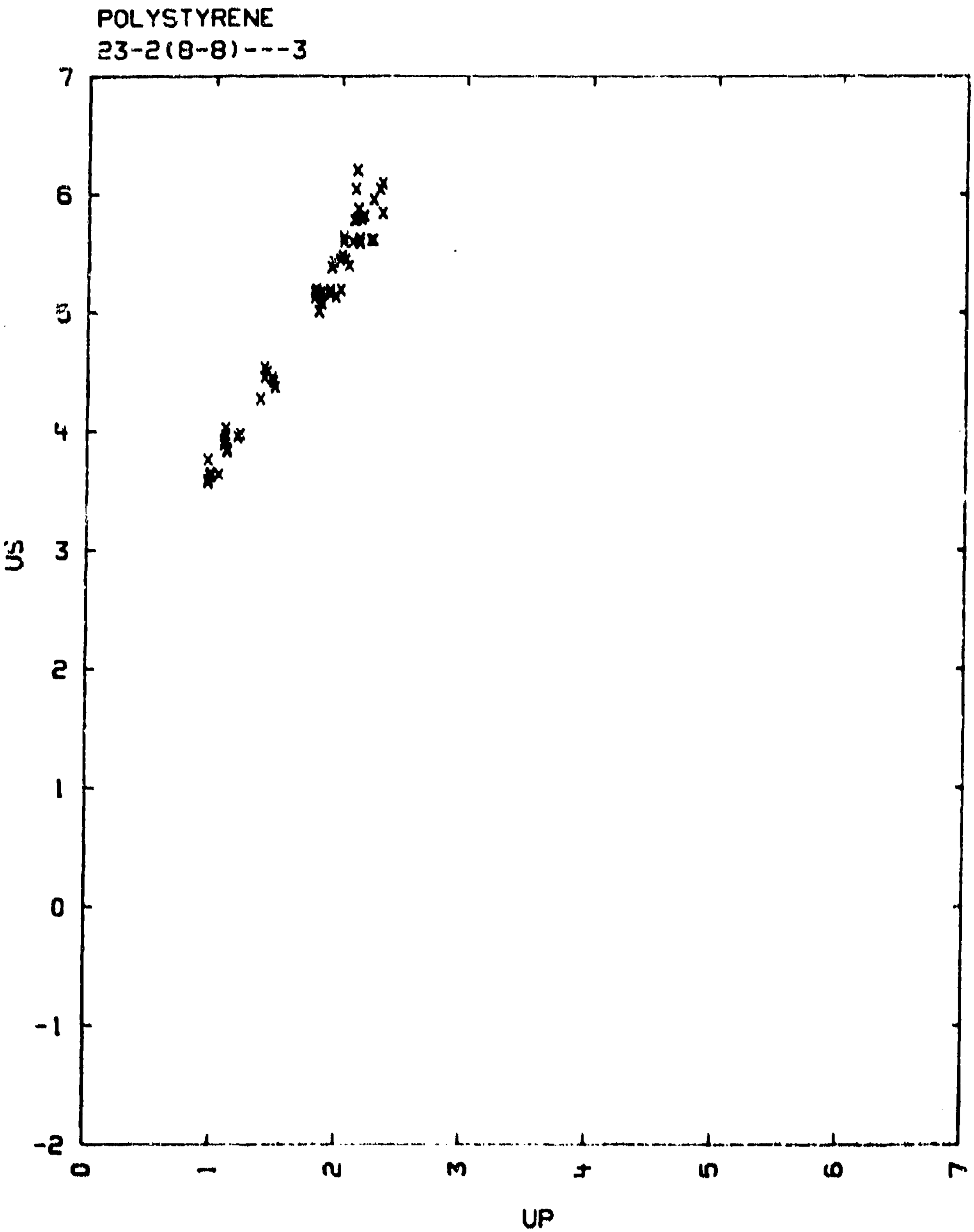
RHOO	US	UP	P	V/VO	UFS	UFS
-	4.533	1.405	67	0.690		1.825
-	4.448	1.400	67	0.685		1.820
-	4.370	1.492	69	0.658		1.925
-	4.413	1.475	68.5	0.666		1.900
-	3.822	1.115	45	0.708		1.402
-	3.852	1.108	45	0.712		1.392
-	3.918	1.090	45	0.722		1.375
-	3.879	1.095	45	0.718		1.380
-	3.582	0.960	36.5	0.732		1.195
-	3.559	0.960	36.5	0.730		1.195
-	3.618	0.972	37	0.731		1.212
-	3.644	0.978	37.5	0.732		1.220
-	3.955	1.097	48	0.722		1.390
-	4.022	1.102	48.5	0.726		1.397
-	3.949	1.195	46	0.697		1.390
-	3.968	1.215	47	0.694		1.405
-	3.754	0.960	38	0.744		1.215
-	3.615	0.980	37.5	0.729		1.200
-	3.626	1.042	40	0.712		1.287
-	3.626	1.037	39.5	0.714		1.302

US = 1.902 + 1.769 UP KM/SEC. SIG.US = 0.14 KM/SEC.

COMMENTS:

1) SOURCE: BERGER J. AND FAUQUIGNON C.
PRIVATE COMMUNICATION (1964), B.P. NO. 7, SEVRAN, FRANCE
2) EXPERIMENTAL TECHNIQUE B
DATA REDUCTION TECHNIQUE B
STANDARD MATERIALS PLEXIGLASS AND ALUMINUM AU4G ALLOY
3) SAMPLE DIMENSIONS WERE: 2.0 CM DIAMETER
0.5 CM THICKNESS

TABLE I



23-2(8-8)---4
POLYSTYRENE

(C6-H5-C(H)-CH2)N = (C8-H8)N

V0 = 0.958 CC/G

IN THE TABLES BELOW, VELOCITIES ARE GIVEN IN KM/SEC, PRESSURE IN KILOBAR AND DENSITY IN G/CC.

TABLE I

SAMPLE					STANDARD	
RHOO	US	UP	P	V/VO	MATERIAL	US(ST)
1.044	4.35	1.27	58.	0.7080	2024 AL	6.41
1.044	4.51	1.29	61.	0.7140	2024 AL	6.44
1.044	5.66	2.21	131.	0.6095	2024 AL	7.30

US = 2.746 + 1.319*UP KM/SEC
SIGMA US = 0.094 KM/SEC

TABLE II

SAMPLE					STANDARD	
RHOO	US	UP	P	V/VO	MATERIAL	US(ST)
0.174	1.81	1.59	5.	0.1215	2024 AL	6.41
0.174	1.91	1.76	6.	0.0785	2024 AL	6.53
0.174	2.11	1.85	7.	0.1232	2024 AL	6.59
0.174	2.51	2.27	10.	0.0956	2024 AL	6.88
0.174	2.49	2.29	10.	0.0803	2024 AL	6.90
0.174	3.48	2.97	18.	0.1466	2024 AL	7.38
0.174	3.44	3.03	18.	0.1192	2024 AL	7.42
0.174	3.33	3.04	18.	0.0871	2024 AL	7.43

US = -.069 + 1.151*UP KM/SEC
SIGMA US = 0.083 KM/SEC

TABLE III

SAMPLE					STANDARD	
RHOO	US	UP	P	V/VO	MATERIAL	US(ST)
0.063	3.33	3.10	7.	0.0691	2024 AL	7.42
0.063	3.81	3.28	8.	0.1391	2024 AL	7.54
0.063	4.37	3.63	10.	0.1693	2024 AL	7.78
0.063	5.66	4.84	17.	0.1449	2024 AL	8.59
0.063	6.57	5.52	23.	0.1598	2024 AL	9.05
0.063	6.69	5.73	24.	0.1435	2024 AL	9.19

POLYSTYRENE

RHOO	US	UP	P	V/VO	MATERIAL	US(ST)
0.063	7.92	6.21	29.	0.1742	2024 AL	9.51
0.063	9.51	6.62	40.	0.3039	2024 AL	9.81
0.063	9.22	6.84	40.	0.2581	2024 AL	9.95
0.063	8.94	7.29	41.	0.1846	2024 AL	10.23

US = -1.096 + 1.443*UP KM/SEC
SIGMA US = 0.515 KM/SEC

TABLE IV

---SAMPLE---					---STANDARD---	
RHOO	US	UP	P	V/VO	MATERIAL	US(ST)
0.032	4.04	3.30	4.	0.1832	2024 AL	5.74
0.032	4.52	3.66	5.	0.1903	2024 AL	7.78
0.032	6.36	4.89	10.	0.2311	2024 AL	8.59
0.032	7.05	5.59	13.	0.2071	2024 AL	9.05
0.032	6.46	5.81	12.	0.1006	2024 AL	9.19
0.032	8.21	6.30	17.	0.2326	2024 AL	9.51
0.031	7.78	6.78	16.	0.1285	2024 AL	9.81
0.032	10.72	6.95	24.	0.3517	2024 AL	9.95
0.032	9.67	7.42	23.	0.2327	2024 AL	10.23

US = -.786 + 1.418*UP KM/SEC
SIGMA US = 0.837 KM/SEC
THE POROUS DATA MAY BE REPRESENTED BY :
US = 2.72 - 103.7*(RHO-1.265)/(1+UP)**3 + 75.1*(RHO-1.265)**2/(1+UP)**3
+ 1.430*UP - 0.831*UP(RHO-1.265) KM/SEC
SIG US = 0.15 KM/SEC

COMMENTS:

1) SOURCE: MCQUEEN, R.G., MARSH, S.P., TAYLOR, J.W., FRITZ, J.M., AND CARTER, W.J.
THE EQUATION OF STATE OF SOLIDS FROM SHOCK WAVE STUDIES, HIGH VELOCITY IMPACT PHENOMENA, KINSLOW (ED.) (ACADEMIC PRESS, NEW YORK, 1970) CHAPTER VII
2) EXPERIMENTAL TECHNIQUE: C
DATA REDUCTION TECHNIQUE: II (STANDARD BASE PLATE AS SHOWN)
3) V(DP/DE) = 1.18

TABLE 1

POLYSTYRENE
23-2(8-8)---4

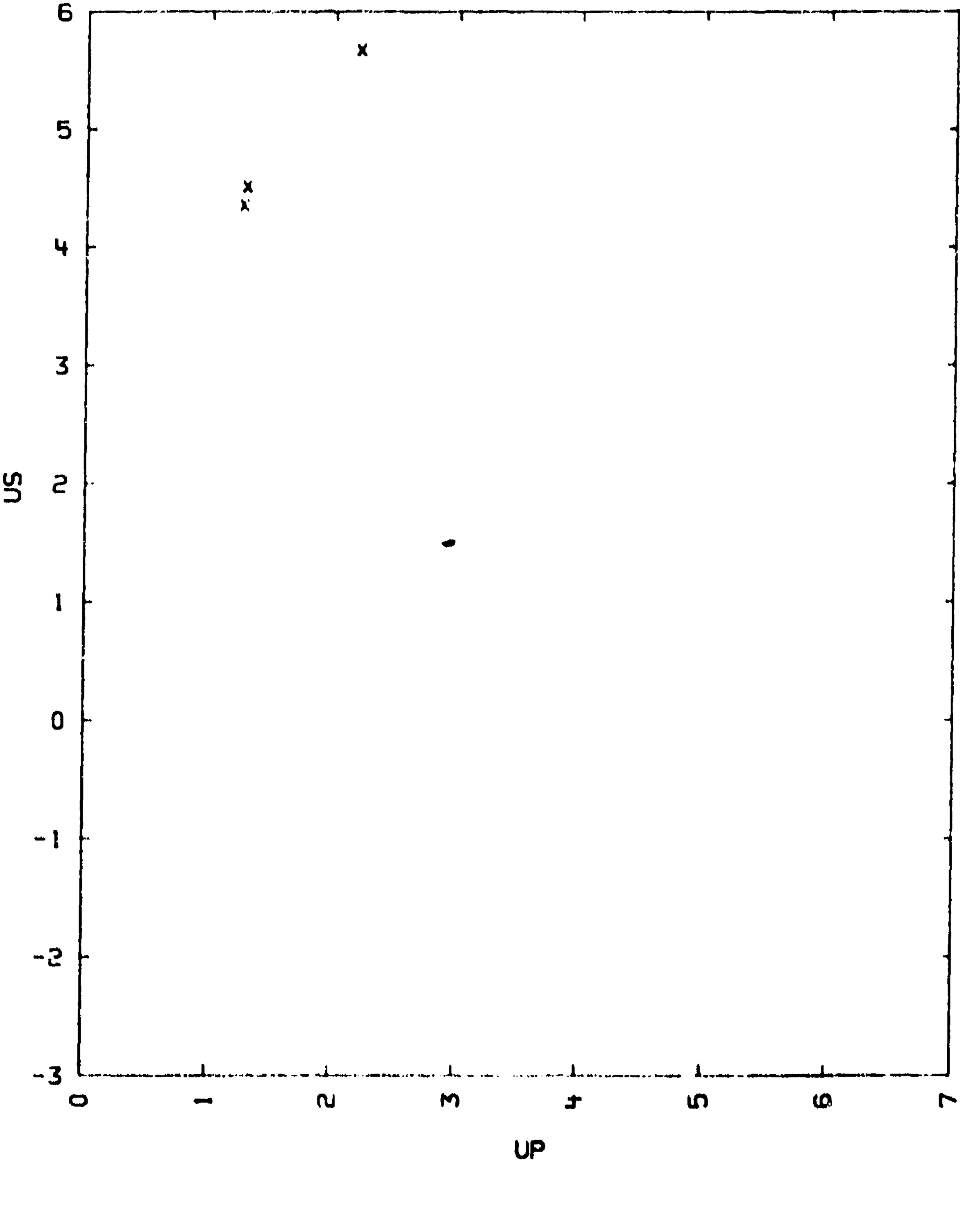


TABLE II

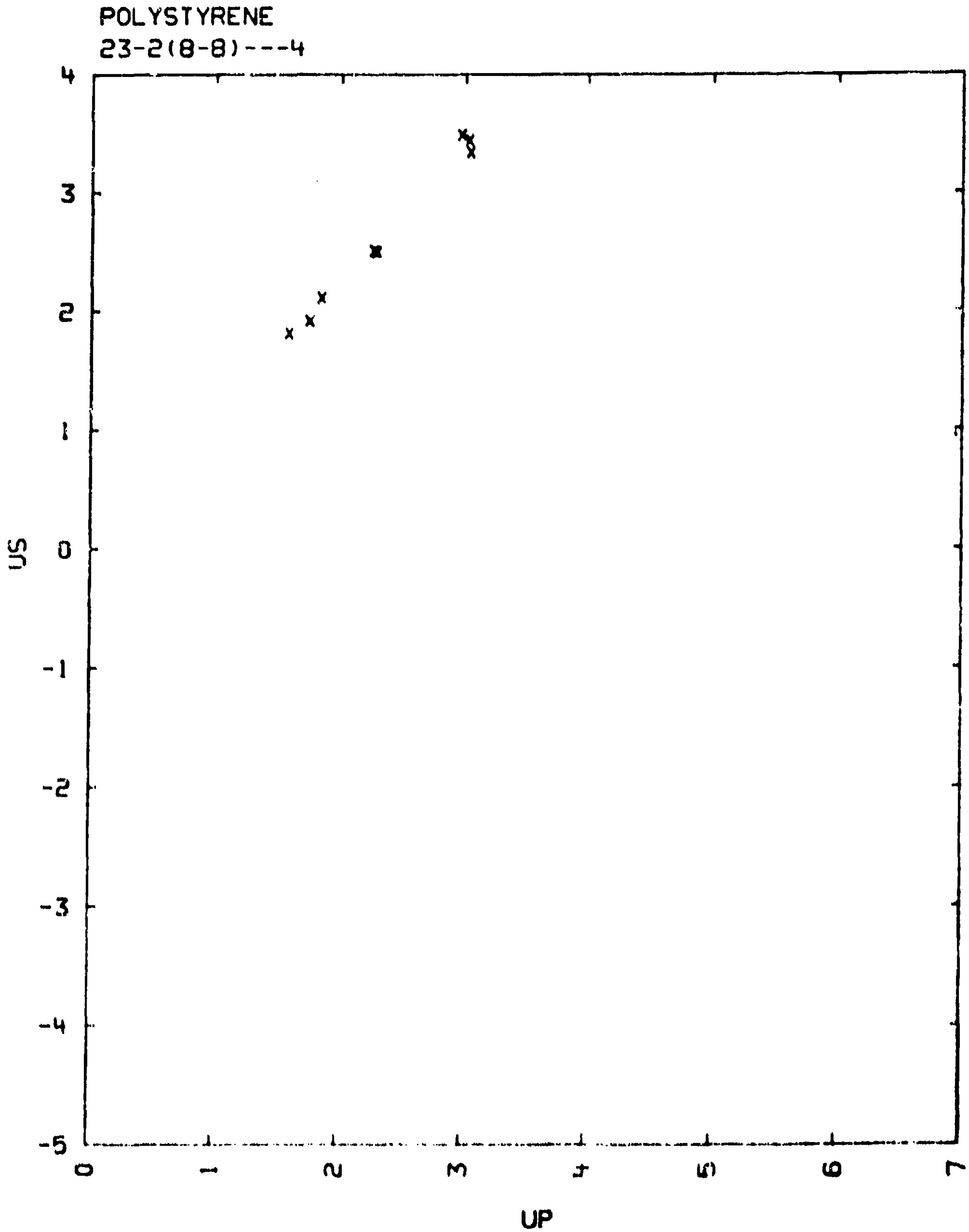


TABLE III

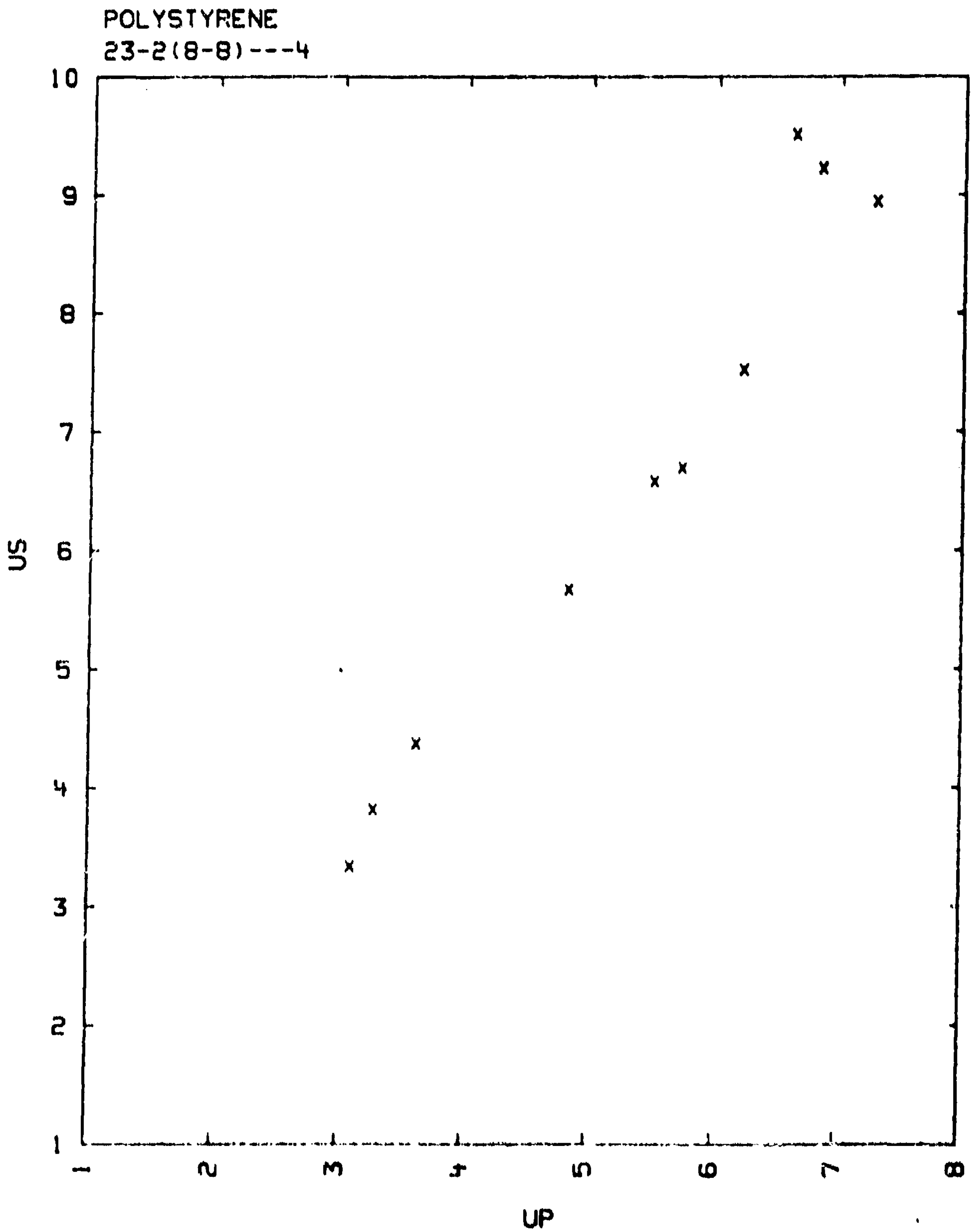
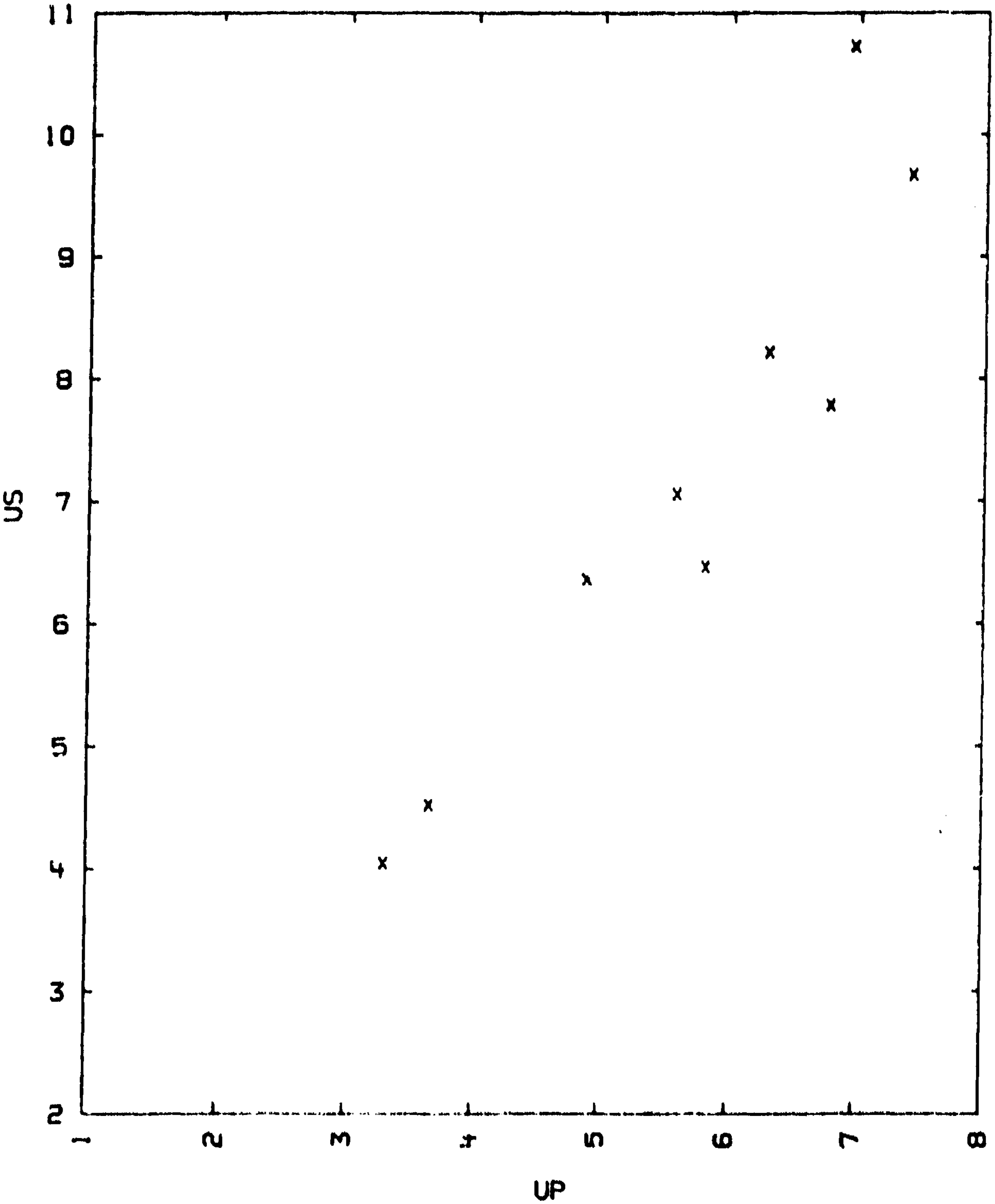


TABLE IV

POLYSTYRENE
23-2(8-8)---4



23-2(14-10)---1
ANTHRACENE

C6-H4*(C-H)2*C6-H4 = C14-H10

VO = 0.8006 +OR- 0.0006 CC/G
VOI = 0.7968 CC/G

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN KM/SEC AND PRESSURE IN KILOBARS.

TABLE

SAMPLE RHOO	US	UP	P	V/VO	STANDARD US(ST)
1.249	3.855	0.409	19.7	0.894	5.741
1.249	3.894	0.480	23.3	0.877	5.804
1.249	4.160	0.679	35.3	0.837	5.987
1.248	4.979	1.278	79.4	0.743	6.558
1.250	5.747	1.689	121.3	0.706	6.979
1.249	5.923	1.904	140.9	0.679	7.187
1.248	6.450	2.230	180.3	0.653	7.534
1.249	6.644	2.497	207.2	0.624	7.785
1.249	6.836	2.871	245.1	0.580	8.141
1.249	7.227	3.438	310.5	0.524	8.690
1.249	7.511	3.789	355.4	0.496	9.035
1.249	8.123	4.358	442.2	0.463	9.615
1.249	8.491	4.433	470.1	0.478	9.728
1.249	9.105	4.836	550.0	0.469	10.166

US = 3.21 + 1.445*UP KM/SEC. SIG US = 0.10 KM/SEC.
FOR UP LESS THAN 2.3 KM/SEC

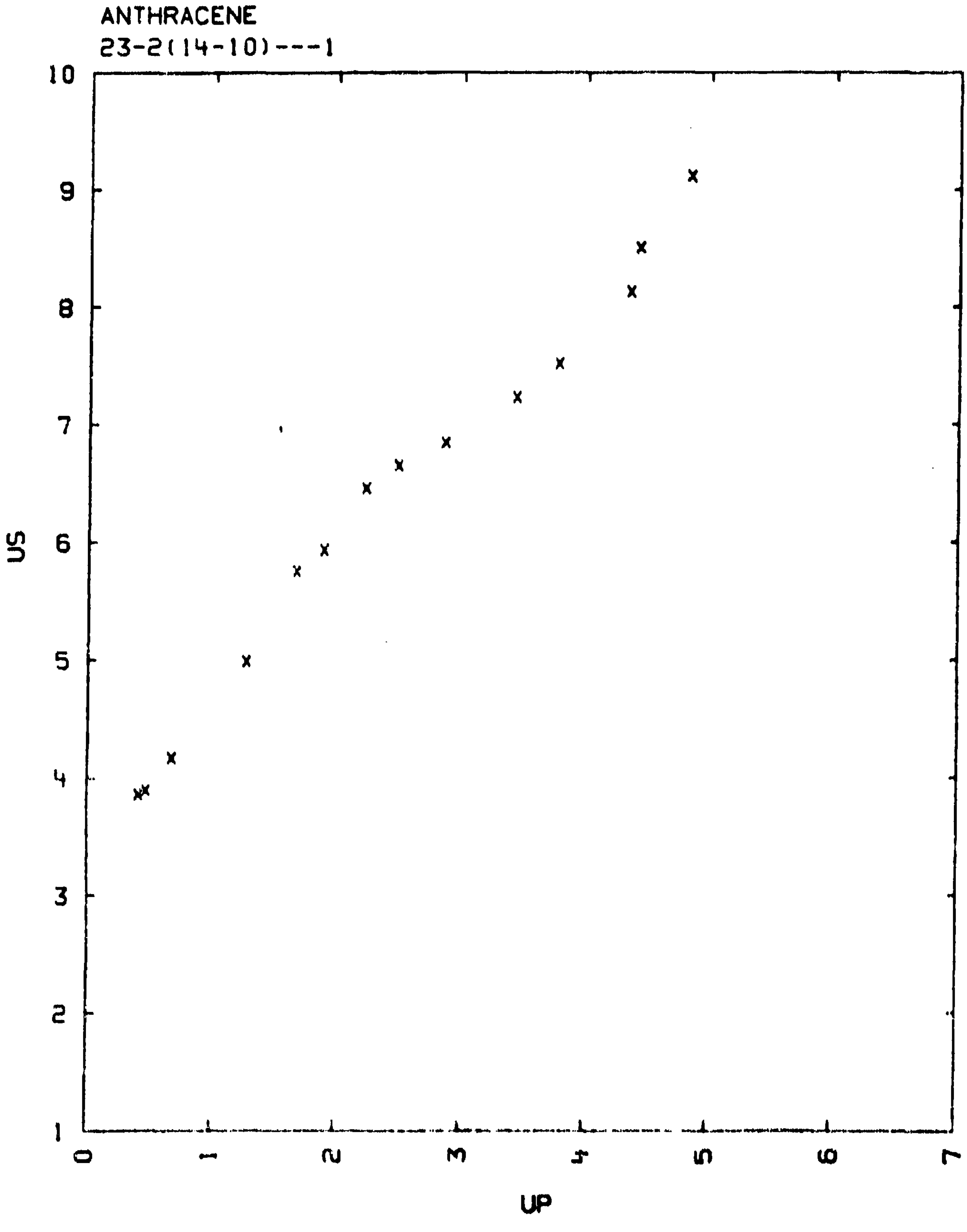
US = 6.722 + 0.005(UP-2.343) + 0.3785(UP-2.343)**2. KM/SEC.
SIG US = 0.23 KM/SEC.
FOR UP BETWEEN 2.34 AND 5. KM/SEC

COMMENTS:

1) SOURCE: WARNES, R.
PRIVATE COMMUNICATION (PRELIMINARY DATA)
LOS ALAMOS SCIENTIFIC LABORATORY, LOS ALAMOS, NEW MEXICO, USA
2) EXPERIMENTAL TECHNIQUE B.
DATA REDUCTION TECHNIQUE B.
STANDARD MATERIAL 1100 ALUMINUM ALLOY: THE EQUATION FOR THE US-UP ALUMINUM STANDARD HUGONIOT RELATIONSHIP IS
US = 5.380 + 1.338*UP KM/SES
WHERE RHOO = 2.712 G/CC.
3.) VOI WAS CALCUALTED USING THE FOLLOWING LATTICE PARAMETERS: A= 8.423, B = 6.023 AND C = 8.544 ANGSTROMS AND THE ANGLE BETA = 103 DEG 30 MINUTES FOR A MONOCLINIC CELL. THESE PARAMETERS WERE OBTAINED

FROM A.C.A. MONOGRAPH 5 (AMERICAN CRYSTALLOGRAPHIC ASSOCIATION,
POLYCRYSTAL BOOK SERVICE, WASHINGTON D. C., 1963) 2ND. EDITION.

TABLE I



23-2(14-10)---2
PHENANTHRENE

C6-H4=(C-H)2=C6-H4 = C14-H10

V0 = 0.8242 +OR- 0.0003 CC/G
V0I = 0.8173 CC/G

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN KM/SEC AND PRESSURE IN KILOBARS.

TABLE

SAMPLE					STANDARD
RHO0	US	UP	P	V/V0	US(ST)
1.212	3.774	0.414	18.9	0.890	5.741
1.212	3.741	0.488	22.1	0.870	5.804
1.212	4.038	0.689	33.7	0.829	5.987
1.212	4.907	1.292	76.8	0.737	6.558
1.213	5.597	1.714	116.4	0.694	6.979
1.212	5.692	1.939	133.8	0.659	7.187
1.212	6.348	2.267	174.4	0.643	7.534
1.213	6.662	2.515	203.2	0.623	7.785
1.213	6.804	2.897	239.1	0.574	8.141
1.212	7.086	3.483	299.2	0.508	8.690
1.213	7.443	3.827	345.6	0.486	9.035
1.213	8.000	4.410	428.0	0.449	9.615
1.212	8.441	4.476	458.0	0.470	9.728
1.212	9.048	4.884	535.6	0.460	10.165

US = 3.097 + 1.417*UP KM/SEC. SIG US = 0.1 KM/SEC.
FOR UP LESS THAN 2.5 KM/SEC

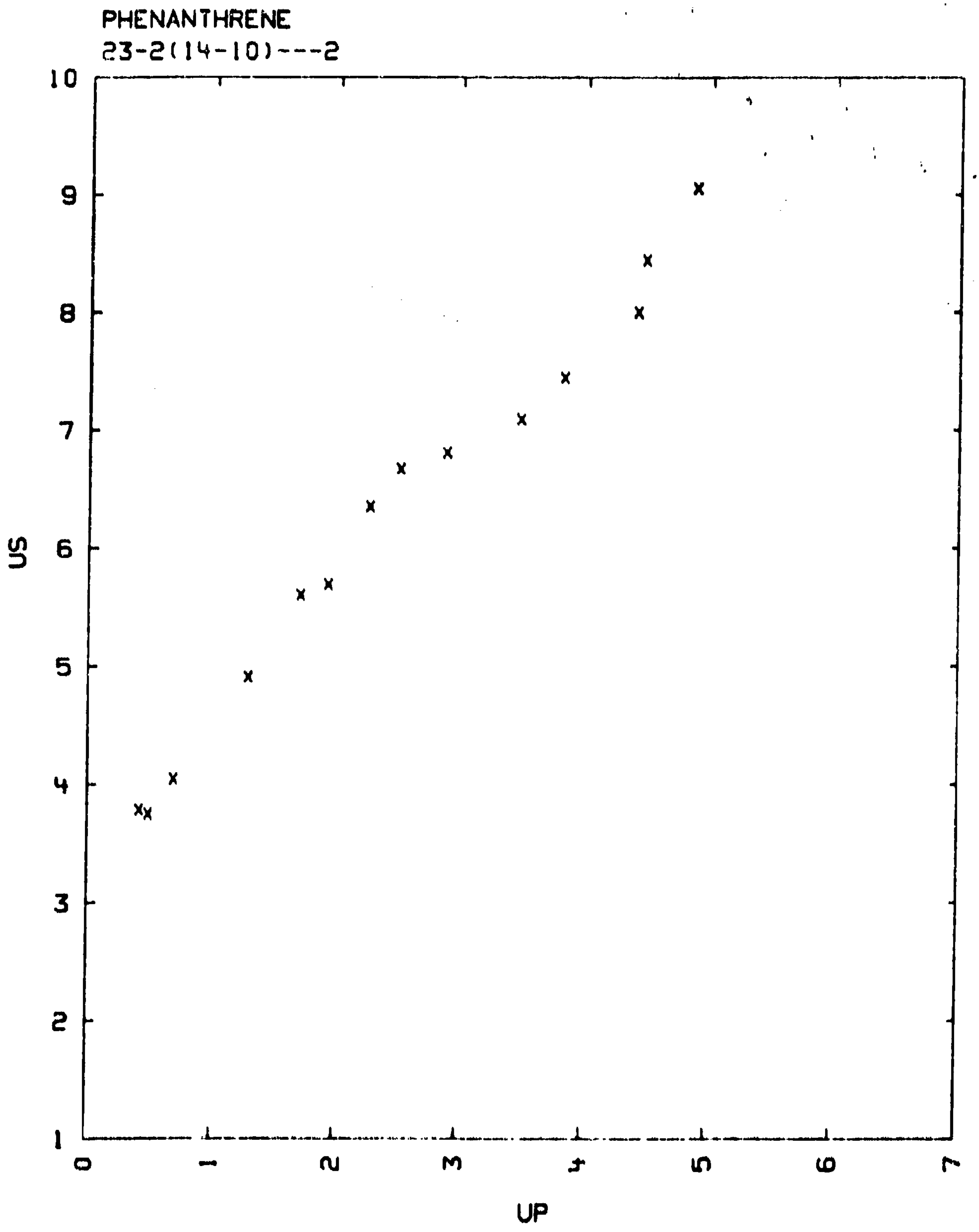
US = 6.734 - 0.0478(UP-2.515) + 0.4302(UP-2.515)**2. KM/SEC
SIG US = 0.24 KM/SEC
FOR UP BETWEEN 2.5 AND 5. KM/SEC

COMMENTS:

1) SOURCE: MARNES, R.
PRIVATE COMMUNICATION (PRELIMINARY DATA)
LOS ALAMOS SCIENTIFIC LAB., LOS ALAMOS, NEW MEXICO, USA.
2) EXPERIMENTAL TECHNIQUE B.
DATA REDUCTION TECHNIQUE B.
STANDARD MATERIAL 1100 ALUMINUM ALLOY: THE EQUATION FOR THE US-UP ALUMINUM STANDARD HUGONIOT RELATIONSHIP IS
US = 5.380 + 1.338*UP KM/SEC
WHERE RHO0 = 2.712 G/CC.
3) V0I WAS CALCULATED USING THE LATTICE CONSTANTS A = 9.434, B = 6.141 AND C= 8.430, WHERE THE ANGLE BETA = 97 DEG 53 MIN FOR A MONOCLINE CELL.

THE PARAMETERS WERE OBTAINED FROM A.C.A MONOGRAPH NUMBER 5 (AMERICAN CRYSTALLOGRAPHIC ASSOCIATION, POLYCRYSTAL BOOK SERVICE, WASHINGTON , D. C., 1983) 2ND EDITION.

TABLE I



23-2(16-10)---1
PYRENE (BENZO(DEF)PHENANTARENE)

C16-H10

VO =0.7844 +OR- 0.0001 G/CC
VOI = 0.776 G/CC

IN THE TABLE BELOW, DENSITY IS GIVEN IN G/CC, VELOCITIES IN KM/SEC AND PRESSURE IN KILOBARS.

TABLE

-------SAMPLE-------					STANDARD
RHOO	US	UP	P	V/VO	US(ST)
1.275	3.647	0.412	19.2	0.887	5.741
1.275	3.746	0.482	23.0	0.871	5.804
1.275	3.998	0.682	34.8	0.829	5.987
1.274	4.861	1.279	79.2	0.737	6.558
1.275	5.534	1.697	119.7	0.693	6.979
1.275	5.836	1.901	141.5	0.674	7.187
1.274	6.273	2.244	179.3	0.642	7.534
1.275	6.584	2.489	208.9	0.622	7.785
1.275	6.942	2.843	251.6	0.590	8.141
1.274	7.099	3.436	310.8	0.516	8.690
1.275	7.412	3.782	357.4	0.490	9.035
1.275	7.947	4.360	441.8	0.451	9.615
1.275	8.382	4.424	472.8	0.472	9.728
1.275	8.944	4.833	551.1	0.460	10.166

US = 3.031 + 1.457*UP KM/SEC, SIG.US = 0.05 KM/SEC
FOR UP LESS THAN 2.423 KM/SEC

US = 6.856 - 0.1806(UP-2.423) + 0.4325(UP-2.423)**2.
SIG US = 0.31 KM/SEC.
FOR UP BETWEEN 2.4 AND 5. KM/SEC

COMMENTS:

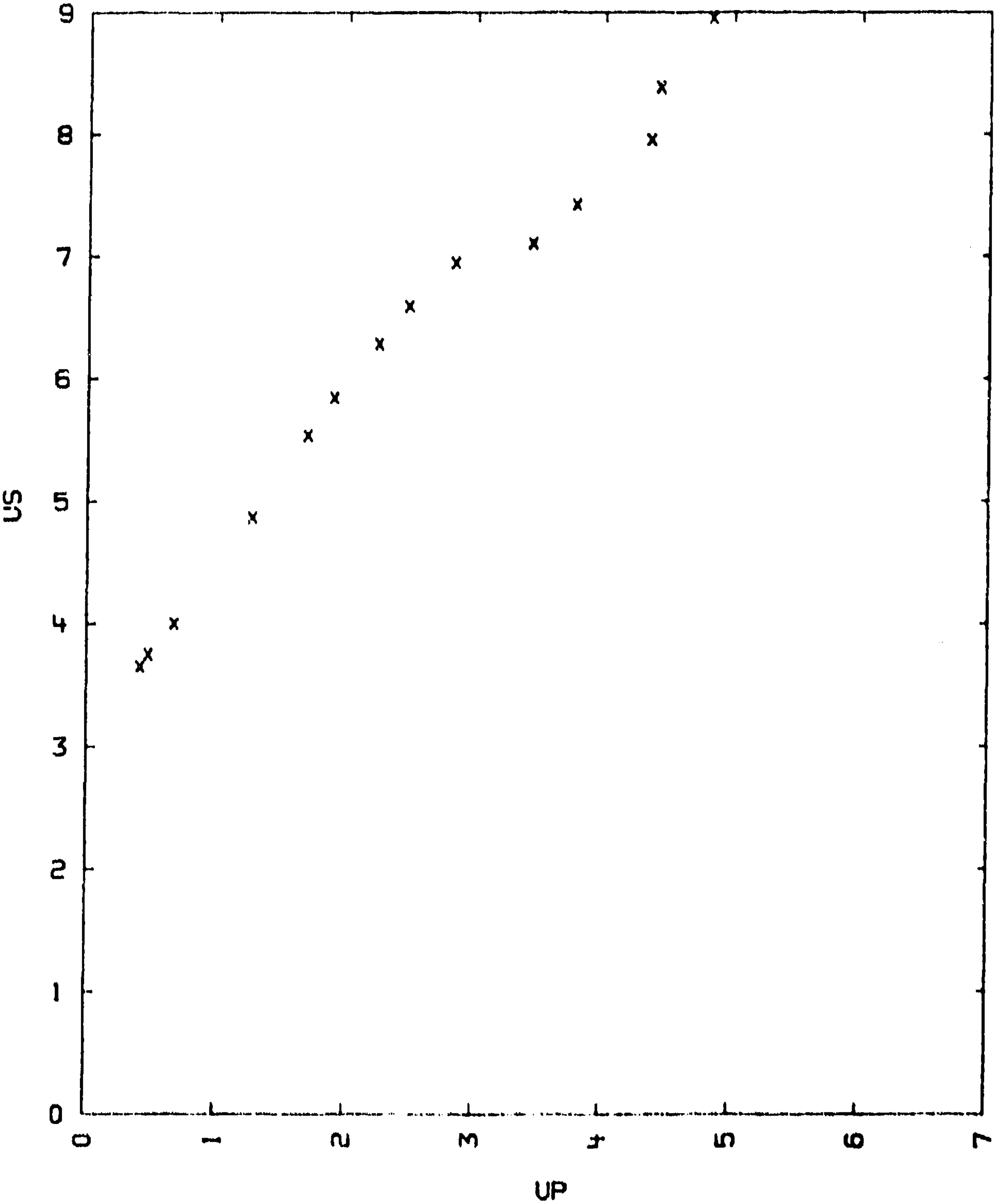
1) SOURCE: WARNES, R.
PRIVATE COMMUNICATION (PRELIMINARY DATA)
LOS ALAMOS SCIENTIFIC LAB., LOS ALAMOS, NEW MEXICO, USA.
2) EXPERIMENTAL TECHNIQUE B.
DATA REDUCTION TECHNIQUE B.
STANDARD MATERIAL 1100 ALUMINUM ALLOY: THE EQUATION FOR THE US-UP ALUMINUM STANDARD HUGONIOT RELATION SHIP IS
US = 5.380 + 1.338*UP KM/SEC,
WHERE RHOO = 2.712 G/CC.
3) VOI WAS CALCULATED USING THE LATTICE CONSTANTS A = 1.363 +OR- 0.005, B = 9.26 +OR- 0.03 AND C = 8.39 +OR- 0.10 ANGSTROMS, WHERE THE ANGLE BETA = 100.2 DEG. FOR A MONOCLINIC CELL.

THE PARAMETERS WERE OBTAINED FROM A.C.A MONOGRAPH 5 (AMERICAN CRYSTALLOGRAPHIC ASSOCIATION, POLYCRYSTAL BOOK SERVICE, WASHINGTON D.C., 1983) 2ND. EDITION.

TABLE I

PYRENE (BENZO(DEF)PHENANTARENE)

23-2(16-10)---1



EDIT TEST

BOX V72 PLTR

TV80LIB DD80 OUTPUT............ 12:46:34U 06/14

49 FRAMES PLOTTED

UNCL

BOX V72 PLTR

15:48:48 06/14/77U

XEROX+FILM

EDIT TEST

BOX V72 PLTR

TV80LIB DD80 OUTPUT............ 13:16:19U 06/14

EDIT TEST

BOX V72 PLTR

TV80LIB DD80 OUTPUT........... 13:16:19U 06/1

UNCL

BOX V72 PLTR

15:46:52 06/14/77U

XEROX+FILM

EDIT TEST

BOX V72 PLTR

TV80LIB DD80 OUTPUT............ 12:35:47U 06/14

EDIT TEST

BOX V72 PLTR

TV80LIB DD80 OUTPUT............ 12:35:47U 06/14